

A. GENERAL OVERVIEW

The Federal Aviation Administration (FAA) created the airport master planning process to provide airport sponsors with a means to conduct systematic and comprehensive evaluations of their capacity to meet existing and future aviation demand at their facilities. The Airport Master Plan, with its Airport Layout Plan (ALP) drawing set, is the centerpiece of the airport planning process at the local level since it presents anticipated infrastructure development needs of an airport during a 20-year planning horizon. Updates to adopted plans are usually necessary in order for an airport sponsor to respond to changing economic or operational realities as well as evolving environmental, technical and/or political conditions. It is typical for a general aviation airport sponsor to update their plan every ten years or at other appropriate times when aircraft operational or airfield conditions warrant. Several factors influence the development of airport infrastructure to achieve maximum aircraft utilization including:

- Meeting FAA airfield design standards
- Addressing growth in aviation activity
- Conforming to aviation safety, security and/or environmental guidelines
- Reconstructing existing infrastructure that is beyond its useful life
- Upgrading existing infrastructure to accommodate the introduction of more demanding aircraft

As more fully described in the following sections, a series of analyses and evaluations are utilized in the airport master planning process to fully address the justification for investment of federal, state, local and private funds in the development of airport facilities and infrastructure including:

- Inventory of Existing Facilities
- Forecasts of Aviation Demand
- Demand/Capacity Analysis and Determination of Facility Requirements



- Alternative Plan Concepts
- Environmental Overview
- Financial Plan
- Airport Development Plans

B. THE PLANNING PROCESS

The purpose of the Master Plan and ALP for the Chesterfield County Airport (FCI) is to provide the County with useful, understandable information and guidance in order to develop and maintain a safe and efficient airport. The ALP provides the Federal Aviation Administration (FAA), the Virginia Department of Aviation (DOAV), Chesterfield County and other interested stakeholders with information concerning planned development at FCI.

This Master Plan Update presents the results of data collection, forecasts, an alternatives analysis and recommendations for the continued development of FCI through the year 2027. The previous Master Plan Update was published in 1994. Since that time, many FAA design standards have changed and aircraft operations have increased significantly which warrant an update to the plan.

The Update is developed in conformance with FAA guidelines for conducting airport master plans and was financed jointly by the FAA, DOAV, and Chesterfield County. It concentrates on assessing existing conditions as well as future needs of FCI. This assessment, along with an inventory of existing airport facilities and operations (Chapter Two), serves as the foundation for analyzing future needs against the capacity of existing infrastructure to meet these needs. The Forecast of Aviation Demand (Chapter Three) examines the anticipated growth in aviation activity at FCI during the 20-year planning period while Facility Requirements (Chapter Four) compares existing facilities and capacities against the forecasted demand.

The Environmental Overview (Chapter Five) includes a report on all known environmental issues on airport property as well as on adjacent land.



Chapter Six, Alternative Development Concepts, presents three alternative concepts to accommodate the forecasted demand. Advantages and disadvantages, land requirements, and order of magnitude cost estimates for each alternative are presented along with a recommendation for selection of a preferred alternative for development.

The Airport Layout Plan (Chapter Seven) presents and discusses the ALP drawing set. These drawings graphically represent the existing conditions along with all planned airport improvements for FCI, including the preferred alternative for development, in the short term (0-5 years), intermediate term (5-10 years) and long-term (10-20 years). The plan set satisfies federal guidelines for airport development identified in the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13, "Airport Design," including Changes 1-13.

The following is a list of sheets provided as part of the Airport Layout Plan (ALP) drawing set, which represent existing conditions along with all planned airport improvements for the 20-year (2008-2027) planning period:

- Cover Sheet
- Existing Airport Layout Drawing
- Airport Layout Plan (ALP)
- Terminal Area Plan (TAP)
- Airport Airspace Drawing
- Inner Portions of Approach Space (2 Sheets)
- Existing Land Use Map
- Future Land Use Map
- Airport Property Map (APM – formerly Exhibit A)

Chapter Eight, Cost Estimates, presents a recommended phased capital development program and provides a schedule of anticipated potential funding allocations from federal, state, local, and private sources to complete the same.



In order to assist the reader in fully understanding the overall context of this planning document, a glossary of common aviation related terms is provided in **Appendix A**.

C. GOALS AND OBJECTIVES

As previously stated, the goal of this Master Plan Update is to provide the framework for future airport development in order to satisfy aviation demand in a cost effective feasible manner, while at the same time weighing all potential environmental and socioeconomic issues of the greater Chesterfield County region. To this end, the primary goal of this update is to examine the feasibility of providing a runway to accommodate the family of medium sized business jets currently based at the airport, represented by the Hawker 800 and Challenger 604. The Update will evaluate the runway length and pavement strength required to serve these critical aircraft based on established FAA design criteria. Consideration will also be given to the alternative development concept that will result in a preferred operational alternative. The preferred operational alternative will then become the basis for the ALP Update.

Beyond providing a runway to accommodate the critical aircraft, the Master Plan Update is expected to:

- Recommend a land acquisition program that will guide the County in its runway extension process and accommodate demand for the 20-year planning period.
- Analyze existing and potential penetrations to FAR Part 77 surfaces that may present a hazard to air navigation, and recommend actions to mitigate any obstructions to ensure the lowest possible safe instrument approach minimums for FCI.
- Recommend navigational aid (NAVAID) improvements and/or additional instrument approach procedures to better accommodate aircraft utilizing FCI during periods of reduced visibility.



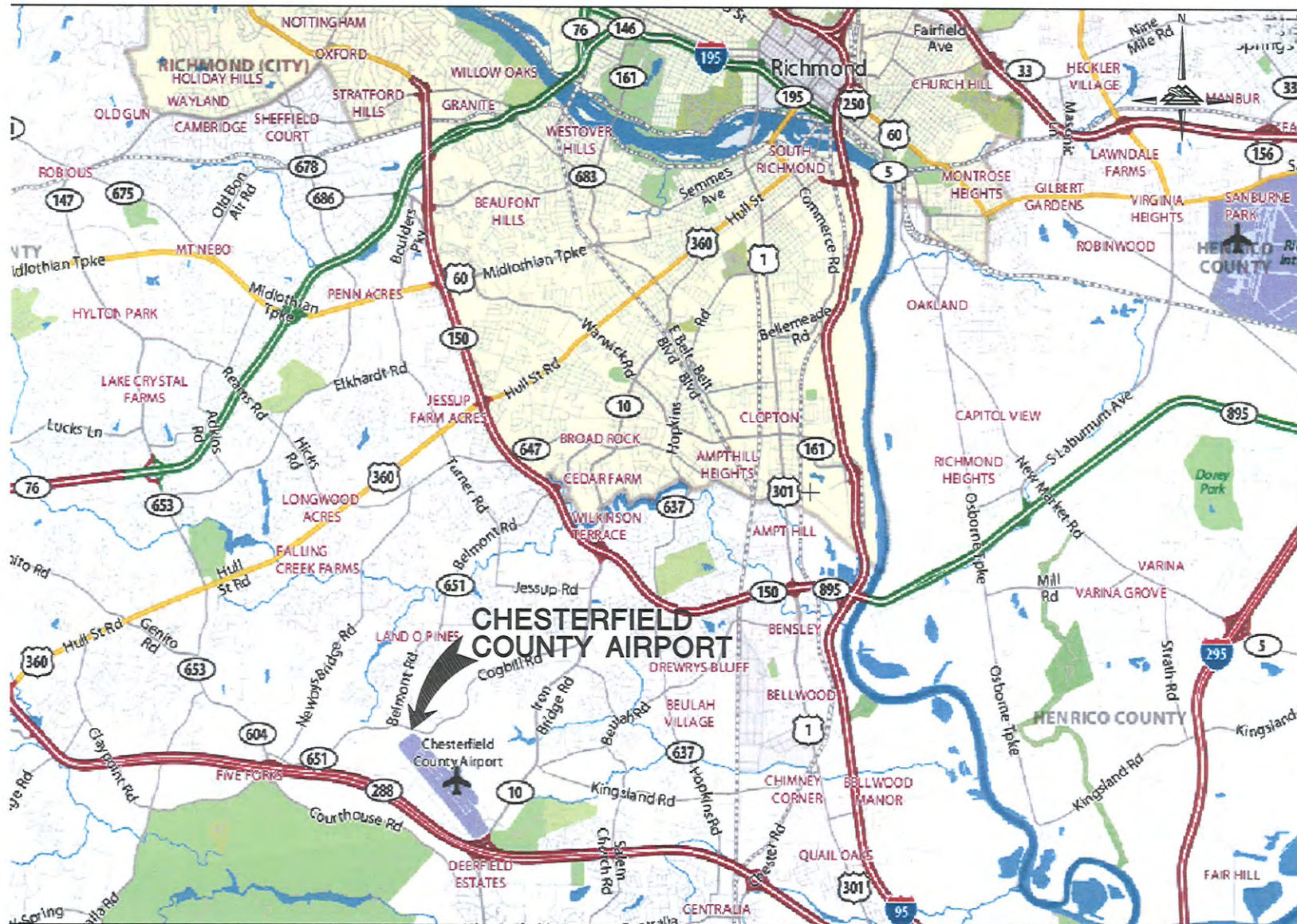
- Evaluate alternatives for development of additional hangar facilities during the 20-year planning period.
- Evaluate the need for an Air Traffic Control Tower (ATCT) and, if warranted, conduct a preliminary site analysis for its location.
- Evaluate the feasibility/need to construct both parallel and crosswind runways
- Evaluate surface access to the airport.
- Conduct a terminal area analysis.
- Evaluate the current non-standard separation between the runway and taxiway.

D. GENERAL INFORMATION

1. Airport Location & Management

FCI is a general aviation reliever airport located approximately one mile north of Chesterfield, Virginia. Chesterfield is the county seat of Chesterfield County and is situated approximately 14 miles south of Richmond, Virginia. Access to the airport is via State Route 10 (Ironbridge Road) to Whitepine Road, then to Airfield Drive. Principal access to FCI from the Richmond Area is via Interstate 95 and State Route 288. Norfolk and Tidewater Virginia are located approximately 90 miles southeast of the airport via Interstate 64 while Washington, D.C. is located approximately 120 miles to the north, via Interstate 95. **Exhibit 1-1**, Airport Vicinity Map, identifies the immediate vicinity around the airport, while **Exhibit 1-2**, Airport Location Map, locates the airport relative to Chesterfield County.





VICINITY MAP CHESTERFIELD COUNTY AIRPORT

EXHIBIT
1-1



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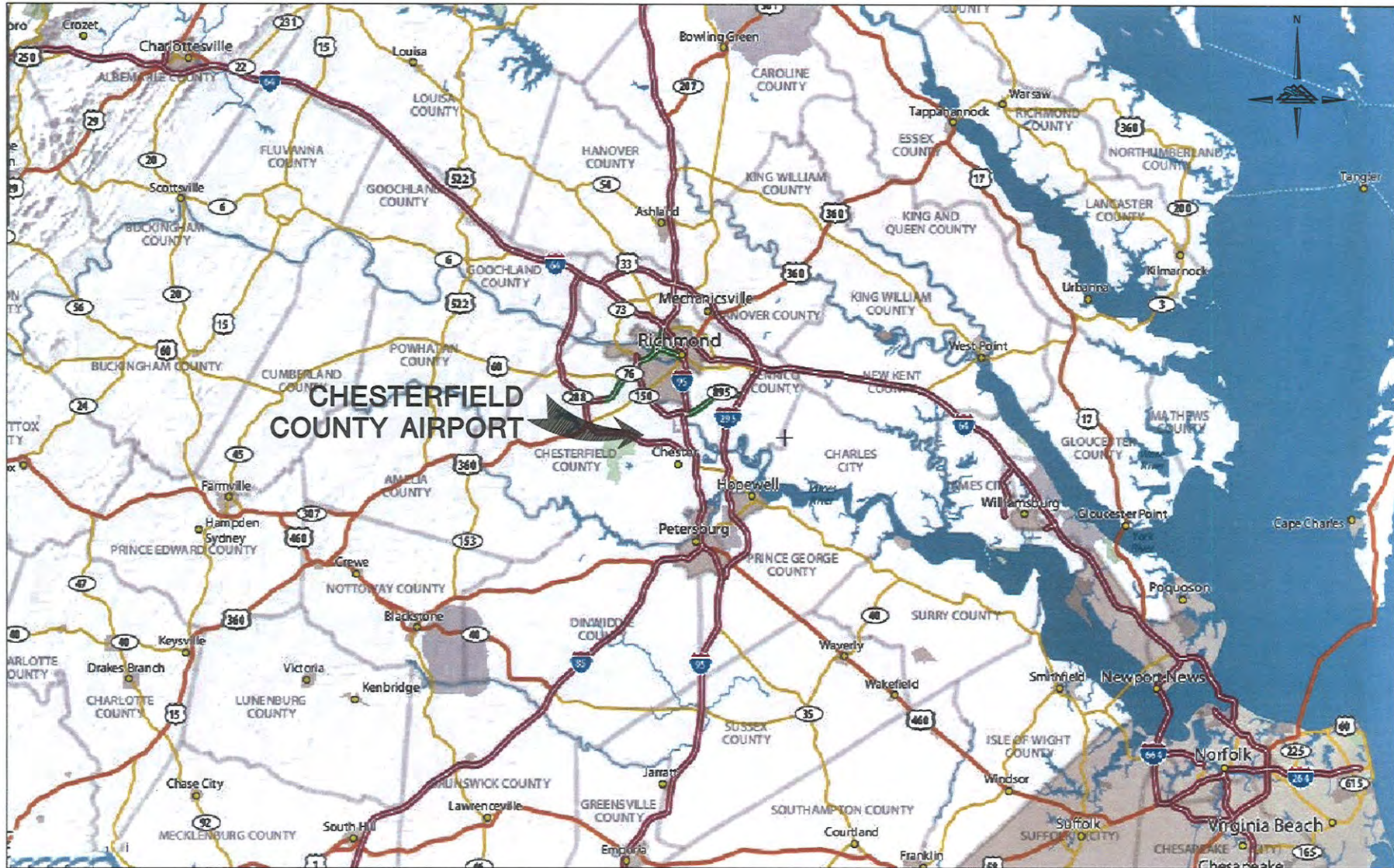
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OCTOBER 2010



LOCATION MAP CHESTERFIELD COUNTY AIRPORT

EXHIBIT
1-2



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FCI is owned and operated by the County of Chesterfield, Virginia. The County operates as a County Administrator form of government and is governed by a five member Board of Supervisors. A full-time airport manager is appointed by the County Administrator to oversee the day-to-day operations of the facility. A staff of an additional four full time employees and two part time employees provide overall administrative, maintenance, and service functions for FCI.

FCI also has an Airport Advisory Board to advise the Board of Supervisors on matters pertaining to the airport. The board consists of six members from each magisterial district and one Ex Officio member from the County. Members are appointed by the Board of Supervisors and serve three-year terms.

2. Airport History

The current location of the Chesterfield County Airport was determined through a site selection study completed in 1969. Construction of the airport began in 1972 after completion and approval of an Environmental Impact Assessment Report (EIAR) while the airport was officially dedicated in October 1973. The facilities developed as part of the original construction project included:

- Acquisition of 556 acres of land
- Construction of a 3,700' x 75' runway (Runway 15-33)
- Construction of 5,135' x 40' wide parallel and connecting taxiways
- Construction of a 28,133 SY aircraft apron area
- Installation of Medium Intensity Runway Lights (MIRLs)
- Installation of Medium Intensity Taxiway Lights (MITLs)
- Construction of the airport access road
- Pavement marking and installation of a wind cone, 36" rotating beacon, segmented circle, and airport fencing
- Installation of Visual Approach Slope Indicators (VASI-2s) and Runway End Identification Lights (REILs) on both runway ends



- Construction of a fuel farm service road

Since the airport was originally completed in 1973, a number of projects have been accomplished including the construction of hangar facilities, a terminal building, automobile parking areas, and installation of navigational aids. Moreover, the runway has been extended on two (2) occasions to meet the growing needs of the aircraft using FCI. In 1974, the runway and parallel taxiway were extended 700 feet to the south to provide a total runway length of 4,400 feet while in 1983 the runway was extended to its current length of 5,500 feet. Federal and state grant in aid funding have played a pivotal role in the development of FCI. A detailed list of various FAA/DOAV grants, including amounts, dates, and a brief description of each project, is provided in **Appendix B**.

3. Airport Role

The National Plan of Integrated Airport Systems (NPIAS) is a planning document utilized by the FAA to identify the nation's airport needs over a 10-year planning period as well as to identify the service level and role of all airports in the federal airport system. Likewise, the Virginia Air Transportation System Plan (VATSP) identifies the state's airport needs. FCI is identified by both NPIAS and VATSP as a reliever airport.

It is important to understand that airports contained in the NPIAS are categorized by their role. The role reflects one of five basic airport service levels which describe the type of service that the airport is expected to provide to the community. The service level also represents funding categories for the distribution of federal aid. The five basic service levels include:

1. Commercial Service – Primary
2. Commercial Service – Non-primary
3. Commercial Service which also serves as a reliever
4. Reliever Airport
5. General Aviation Airport



The VATSP “identifies airport function, primary economic role, optimal Airport Reference Code (ARC), and to a lesser extent, funding category eligibility.” The VATSP classifies airports in the following categories:

1. Commercial Service (CS)
2. Reliever (RL)
3. General Aviation Regional (GR)
4. General Aviation Community (GC)
5. Local Service (LO)

In addition to defining the role of the airport, the FAA has a system to correlate airport design criteria to the operating (approach speed) and physical (wingspan) characteristics of the most demanding aircraft currently using or expected to use an airport with greater than 500 annual operations. This airport classification system is contained in FAA Advisory Circular (AC) 150/5300-13, Airport Design. The Airport Reference Code (ARC) system is comprised of two components. The first component, depicted by a letter (A-E), designates the aircraft approach category, determined by approach speed. The second component, depicted by a roman numeral (I-VI), designates the airplane design group, determined by the wingspan. **Table 1-1** identifies the Aircraft Approach Categories and Aircraft Design Groups that have been established by the FAA.

Table 1-1
Approach Categories and Design Groups

Approach Category	Aircraft Design Group
A - Less than 90 knots	I - Wing span less than 48 feet
B - 91 to 120 knots	II - Wing span 49 feet to 78 feet
C - 121 to 140 knots	III - Wing span 79 feet to 117 feet
D - 141 to 165 knots	IV - Wing span 118 feet 170 feet
E - Greater than 165 knots	V - Wing span 171 feet to 196 feet
	VI - Wing span 197 feet to 262 feet

Source: FAA AC 150/5300-13, Airport Design

Because of the aircraft currently utilizing and based at FCI, the NPIAS and the VATSP categorize this facility as a reliever airport to Richmond International Airport in the general aviation category. The airport reference code as listed on the currently approved



Airport Layout Plan (ALP) is C-II, and the critical aircraft is noted as the Gulfstream III. Examples of aircraft that may typically operate at a C-II airport and their respective airport reference code classifications are listed in **Table 1-2**.

Table 1-2
Chesterfield County Airport
Typical Aircraft

Aircraft	ARC	Approach Speed (Knots)	Wing Span (ft.)	Max Takeoff Weight (lbs.)
Cessna 150	A-I	55	33	1,600
Cessna 172	A-I	61	36	2,658
Beech Bonanza F33A	A-I	70	34	3,400
Piper Navajo	B-I	100	41	6,200
Beech Baron 58P	B-I	101	38	6,200
Cessna Citation I	B-I	108	47	11,850
Raytheon Beechjet	B-I	105	44	16,100
Cessna Conquest 441	B-II	100	50	9,925
Beech King Air B200	B-II	103	55	12,500
Citation V	B-II	98	52	15,900
Dassault Falcon 20	B-II	107	54	28,660
HS-125 Series 700	C-I	125	47	24,200
Cessna 650 Citation	C-II	131	54	21,000
Hawker 800	C-II	127	52	28,000
Bombardier CL-600	C-II	125	62	41,250
Challenger 604	C-II	125	64	47,600
Grumman G-III*	C-II	136	78	68,700
Gates Learjet 35	D-I	143	40	18,300
Grumman G-IV	D-II	145	78	71,780

Note: * denotes critical aircraft from previously approved Master Plan (1994)

Sources: FAA AC 150/5300-13, Airport Design
Delta Airport Consultants, Inc.

In summary, FCI is a thriving general aviation reliever airport serving a broad business and personal aviation community as evidenced by the fact that, as reported to DOAV in January 2009, 130 aircraft are currently based at the airport and it accommodates approximately 82,500 civilian and military flight operations airport each year. These operations include single-engine and twin-engine aircraft used for business, pleasure and flight training as well as significant corporate jet traffic.



Chapter Two

INVENTORY OF EXISTING CONDITIONS

In order to obtain an accurate inventory of existing conditions at FCI, all pertinent data that relates to the airport and its service area were evaluated and cataloged. The scope of this inventory included a review of existing airport facilities, pertinent local or regional planning guidance, and previous planning documents, including the 1994 Airport Master Plan Update. This chapter will update the information in the inventory chapter of the previous Airport Master Plan. Moreover, the collected information will provide the foundation for compilation of aviation forecasts, facility requirements, and future layout components of this planning study. **The description of existing airport facilities and services at FCI is based on conditions as they existed in August 2008.**

A. AIRFIELD CONFIGURATION/INFRASTRUCTURE

The existing runway and taxiway system at FCI is shown in **Exhibit 2-1** while **Table 2-1** presents an inventory of the runway system.

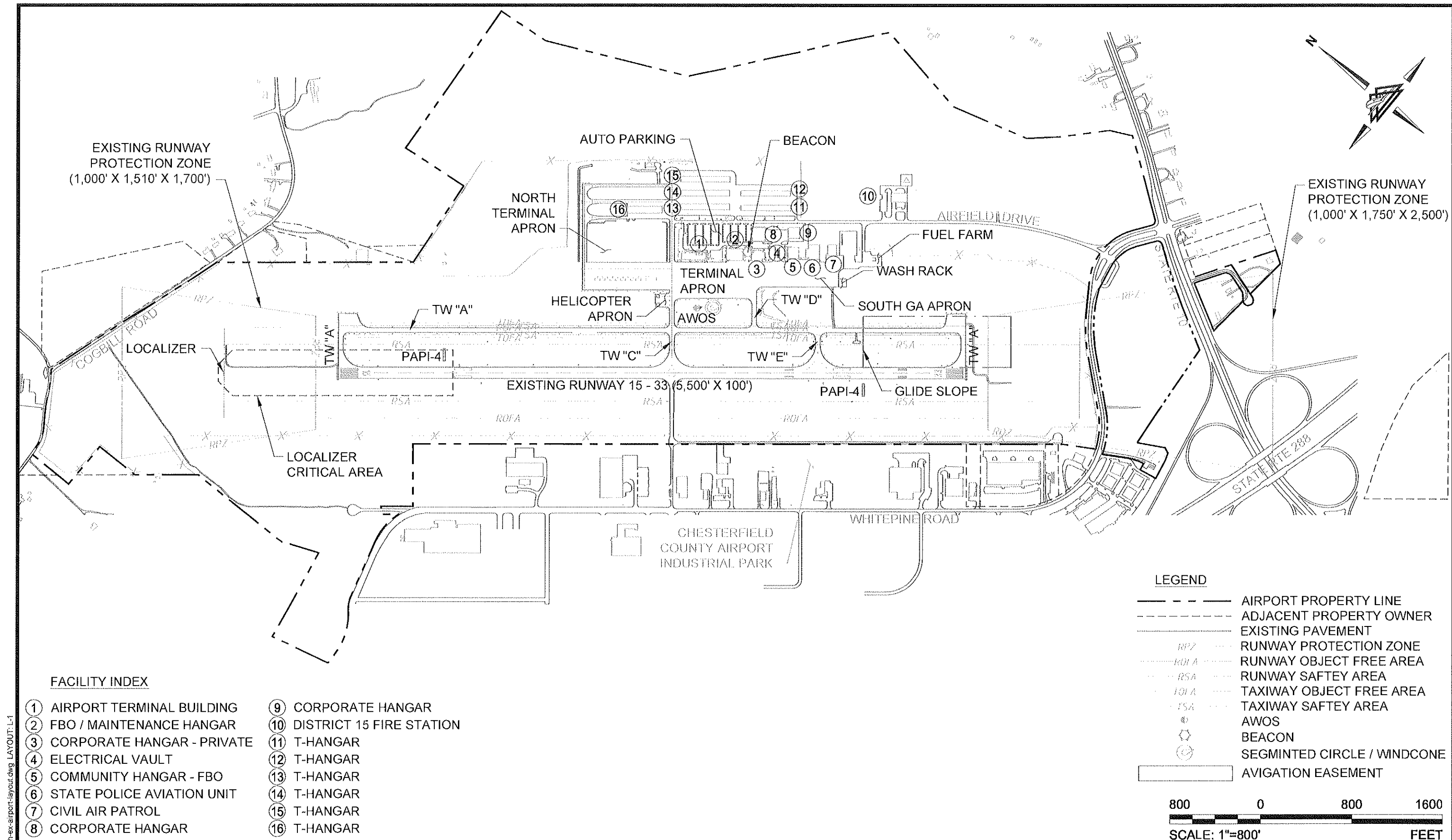
1. Runway System

Table 2-1
Chesterfield County Airport
Runway Data

	Runway 15-33
Length	5,500'
Width	100'
Displaced Threshold	None
Airport Reference Point	Lat: 37° 24' 23.535" N
Latitude / Longitude	Long: 77° 31' 29.953" W
Elevation (MSL)	237'
Lighting	HIRL
Marking	RW 15 – Non-precision (Excellent Condition) RW 33 – Precision (Excellent Condition)
Instrumentation	RW 15 – PAPI RW 33 – PAPI, MALSR
ARC	C-II

Sources: Delta Airport Consultants, Inc.
www.AirNav.com





FACILITY INDEX

- | | |
|------------------------------|----------------------------|
| ① AIRPORT TERMINAL BUILDING | ⑨ CORPORATE HANGAR |
| ② FBO / MAINTENANCE HANGAR | ⑩ DISTRICT 15 FIRE STATION |
| ③ CORPORATE HANGAR - PRIVATE | ⑪ T-HANGAR |
| ④ ELECTRICAL VAULT | ⑫ T-HANGAR |
| ⑤ COMMUNITY HANGAR - FBO | ⑬ T-HANGAR |
| ⑥ STATE POLICE AVIATION UNIT | ⑭ T-HANGAR |
| ⑦ CIVIL AIR PATROL | ⑮ T-HANGAR |
| ⑧ CORPORATE HANGAR | ⑯ T-HANGAR |

LEGEND

- AIRPORT PROPERTY LINE
- ADJACENT PROPERTY OWNER
- EXISTING PAVEMENT
- RPZ RUNWAY PROTECTION ZONE
- ROFA RUNWAY OBJECT FREE AREA
- RSA RUNWAY SAFETY AREA
- TOFA TAXIWAY OBJECT FREE AREA
- TSA TAXIWAY SAFETY AREA
- AWOS
- BEACON
- SEGMENTED CIRCLE / WINDCONE
- AVIGATION EASEMENT



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**EXISTING AIRPORT LAYOUT
CHESTERFIELD COUNTY AIRPORT**

**EXHIBIT
2-1**

2. Wind Analysis

The orientation of Runway 15-33 to the prevailing wind direction is critical to the safe operation of aircraft, especially small, single engine aircraft that are more susceptible to crosswinds.

When prevailing winds are consistently from one direction, runways are best oriented in that direction. In many cases however, a high degree of consistency of wind direction is not found, and thus the crosswind component is also evaluated to ensure acceptable wind coverage. Crosswinds are winds which tend to be perpendicular to the runway or path of an aircraft while landing or taking off. At an airport with a single runway, that runway should be oriented with respect to the prevailing winds so that at least 95 percent of the time the crosswind component does not exceed a velocity of 10.5 nautical miles per hour (knots). Where a single runway does not provide at least 95 percent coverage, a combined system of runways or a widened runway should be considered that would meet the 95 percent criteria.

The FAA recommends 95 percent wind coverage for various crosswind components based on specific airport reference codes (ARC). The 95 percent wind coverage is computed on the basis of the crosswinds not exceeding 10.5 knots for ARC A-I and B-I, 13 knots for ARC A-II and B-II, 16 knots for ARC A-III and B-III, and C-I through D-III, and 20 knots for ARC A-IV through D-IV as detailed in AC 150/5300-13 "Airport Design".

The existing ARC classification for FCI, as indicated on the approved ALP, is C-II. Using the above referenced criteria, wind coverage would be computed for a 16 knot crosswind component. Although the wind coverage criteria recommends coverage based on the ARC of the runway, it has been evaluated for the more conservative 10.5 knot and 13 knot crosswinds (**Table 2-2**). This analysis is warranted due to the number of small, single engine piston, and twin engine piston aircraft that utilize FCI on a regular basis.



Table 2-2
Chesterfield County Airport
Wind Coverage (Percent)

	10.5 Knots	13 Knots
Runway 15-33		
ALL WEATHER	91.06%	95.28%
IFR*	92.16%	95.88%

* < 1,000' ceiling and /or visibility < 3.0 miles, but > 200' ceiling and visibility > 0.5 miles

Source: National Climatic Data Center, Station: Richmond, VA

FAA Design Program Version 4.2D

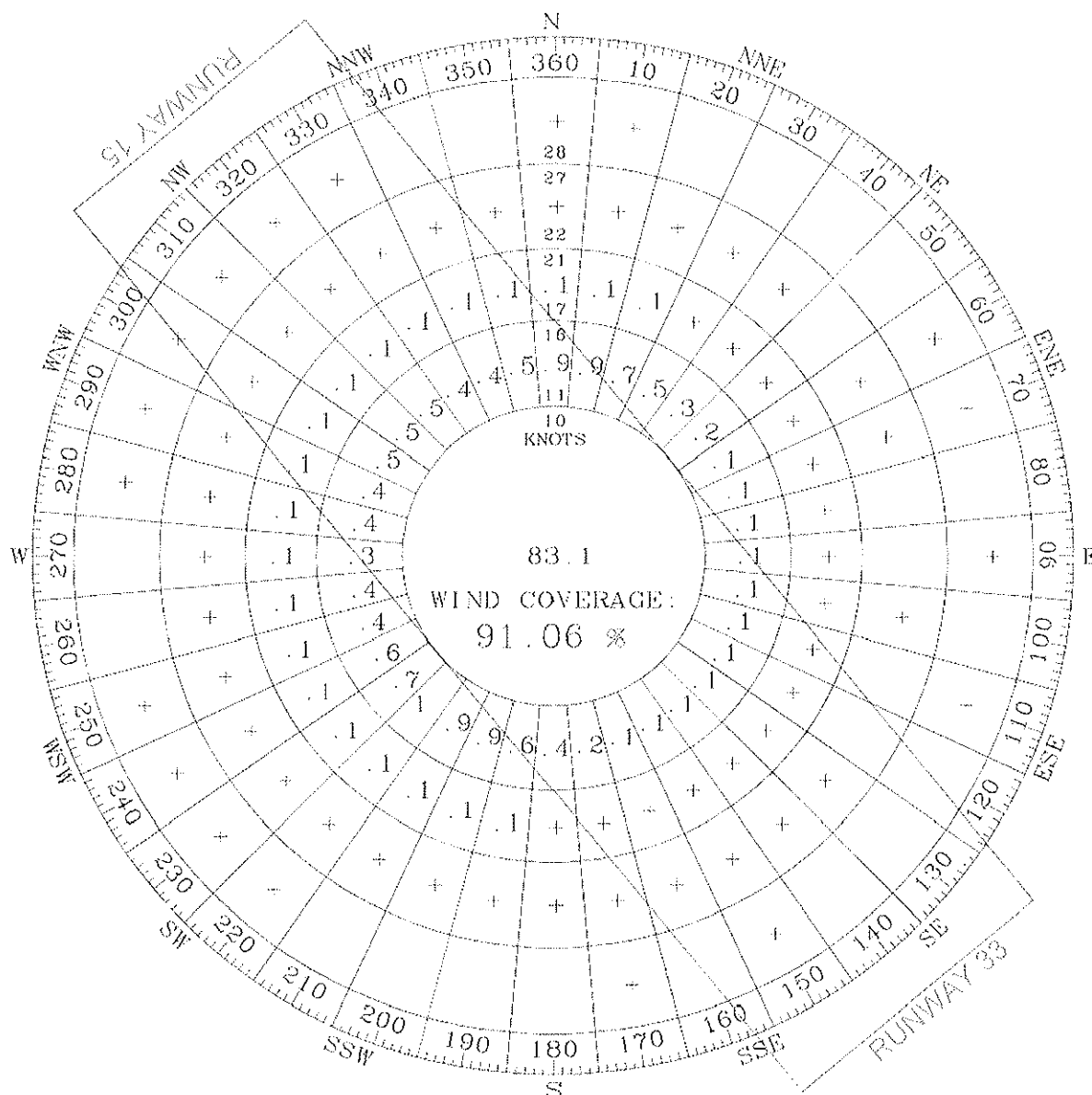
The primary method of analyzing wind conditions at an airport is by using a wind rose. **Exhibits 2-2** and **2-3** illustrate the All Weather and IFR wind roses for a 10.5 knot crosswind on Runway 15-33. **Exhibits 2-4** and **2-5** illustrate the All Weather and IFR wind roses for a 13 knot crosswind. Wind data is represented on the wind rose in terms of the percentage of time winds of different velocities originate from various compass directions. The concentric circles on the wind rose indicate wind velocity in miles per hour. The radial lines on the wind rose define the compass directions from which the winds originate. The numbers within the segments are the percentages of time and velocity the wind originating from that direction.

For this Update, wind data for the period of 1999 to 2008 was obtained from the National Climatic Data Center in Asheville, North Carolina for Richmond, Virginia. Richmond is located 11 nautical miles northeast of FCI. The wind roses indicate that Runway 15-33 provides greater than 95 percent coverage with a 13 knot crosswind component, and thus there is adequate wind coverage for FCI with the existing runway alignment.

3. Runway Designations

Runway numerals for each runway end are determined from the approach direction to the runway end and should be equal to one-tenth of the magnetic azimuth of the runway centerline, measured in the clockwise direction from magnetic north. Although the true bearing of the runway will not change over time, the magnetic bearing will change as the location of magnetic north shifts.





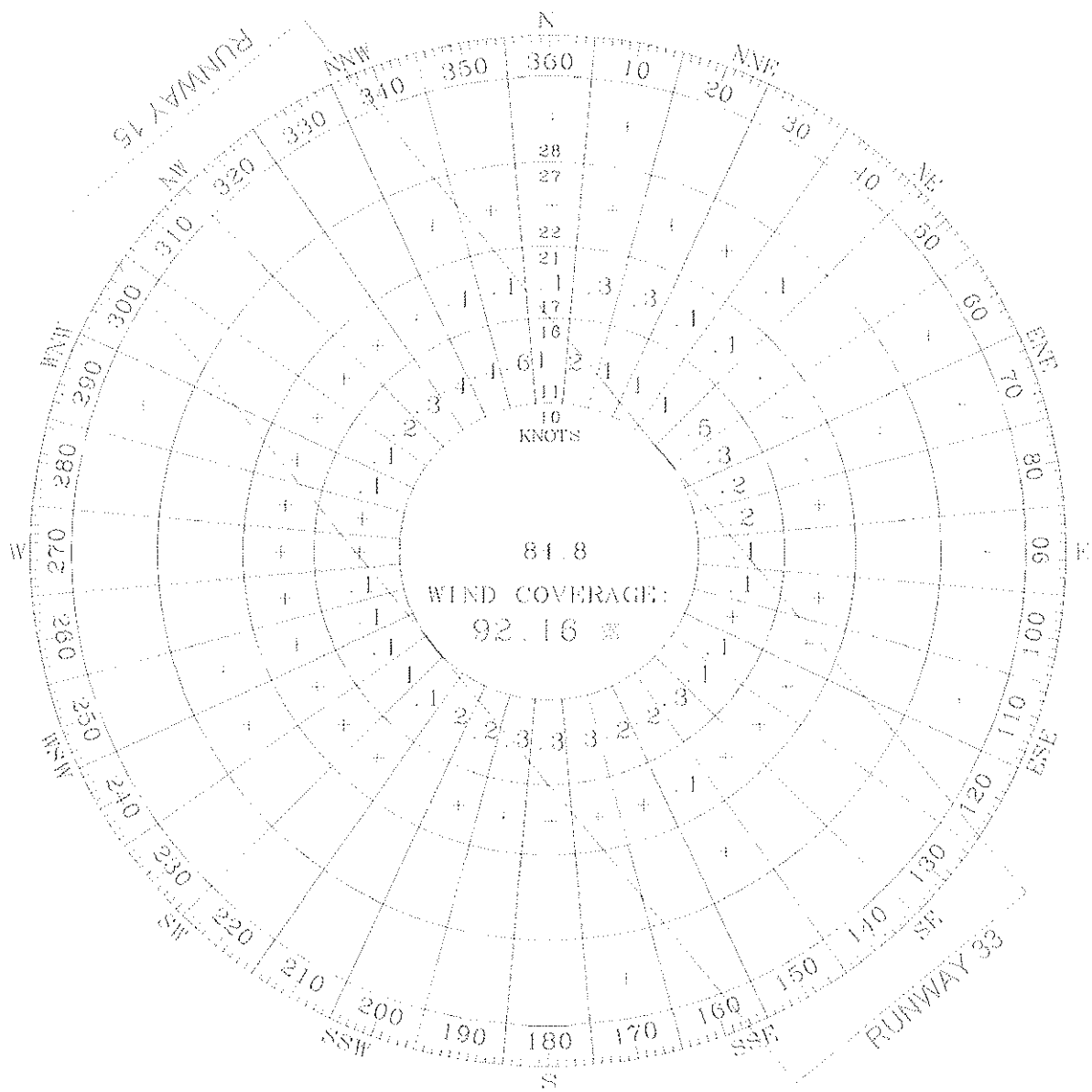
WIND DATA PERIOD: 1999-2008
 SOURCE: NATIONAL CLIMATIC DATA CENTER
 STATION: RICHMOND, VIRGINIA



ALL WEATHER WINDROSE - 10.5 KNOTS **CHESTERFIELD COUNTY AIRPORT**

EXHIBIT
2-2

DRAWN BY: LKH CHECKED BY: KSK SCALE: NONE DATE: OCTOBER 2010



WIND DATA PERIOD: 1999-2008
 SOURCE: NATIONAL CLIMATIC DATA CENTER
 STATION: RICHMOND, VIRGINIA

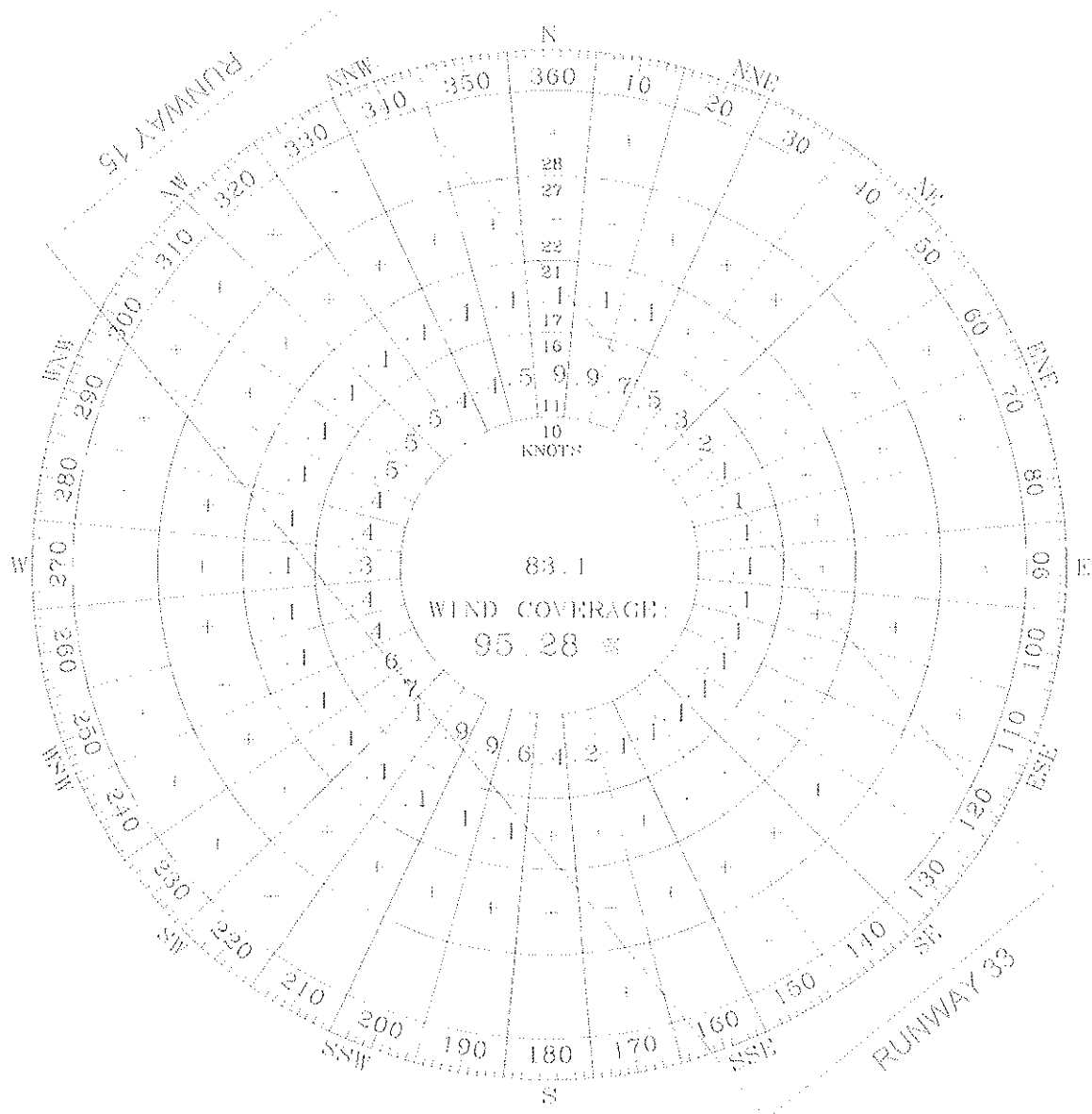


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IFR WINDROSE - 10.5 KNOTS CHESTERFIELD COUNTY AIRPORT

EXHIBIT
 2-3

DRAWN BY: LKH CHECKED BY: KSK SCALE: NONE DATE: OCTOBER 2010



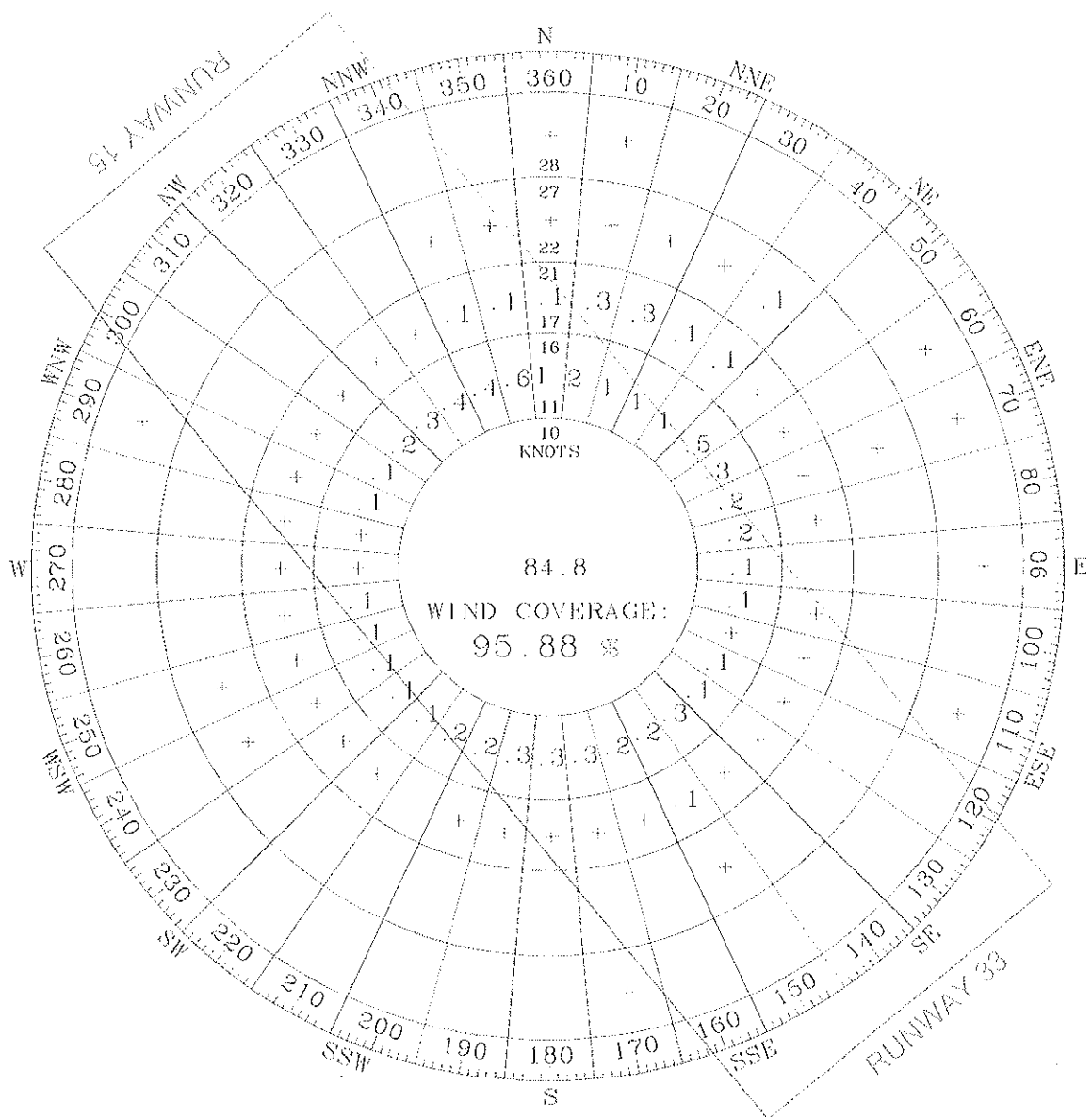
WIND DATA PERIOD: 1999-2008
 SOURCE: NATIONAL CLIMATIC DATA CENTER
 STATION: RICHMOND, VIRGINIA



ALL WEATHER WINDROSE - 13 KNOTS **CHESTERFIELD COUNTY AIRPORT**

EXHIBIT
2-4

DRAWN BY: LKH CHECKED BY: KSK SCALE: NONE DATE: OCTOBER 2010



WIND DATA PERIOD: 1999-2008
 SOURCE: NATIONAL CLIMATIC DATA CENTER
 STATION: RICHMOND, VIRGINIA



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IFR WINDROSE - 13 KNOTS CHESTERFIELD COUNTY AIRPORT

EXHIBIT
 2-5

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Table 2-3 provides a summary of the true (geographic) compass readings for each runway and notes the magnetic declination required to adjust to the magnetic compass readings. Based on this analysis, the designations for Runway 15-33 remain unchanged.

Table 2-3
Chesterfield County Airport
Runway Compass Reading Analysis

	Runway 15-33
True Compass Reading	320° 30'
Magnetic Declination	9° 59' W
Magnetic Compass Reading	330° 29'

Sources: Delta Airport Consultants, Inc.
National Geophysical Data Center Website, 2008 (ngdc.noaa.gov)

4. Taxiway and Taxilane System

FAA Advisory Circular, AC 150/5300-13, Airport Design, presents design standards for taxiway and taxilane development. A taxiway is defined as a path established for the taxiing of aircraft from one part of the airport to another. A taxilane is defined as the portion of the aircraft parking area used for the access between taxiways and aircraft parking positions.

Runway 15-33 is supported by Taxiway 'A', a full-length parallel taxiway, located approximately 375 feet from the runway centerline. Taxiway 'A' provides an entrance taxiway to each end of Runway 15-33, with Taxiways 'C' and 'E' serving as exit taxiways from the runway to Taxiway 'A'. Taxiway 'C' extends across 'A' to provide access to the terminal apron. Taxiway 'D' extends perpendicular from Taxiway 'A' connecting it to the south GA apron. All taxiways are served by MITLs. A partial parallel taxiway serves the Chesterfield County Airport Industrial Park to the southwest of the airport and is connected to the runway by Taxiway 'C'. Access to the airport from the Industrial Park via Taxiway 'C' is controlled by a security gate.

Markings for the parallel and connector taxiways are in fair to poor condition. The markings will be repainted with the pavement rehabilitation project scheduled for 2009.



The airport has designated taxilanes leading to and throughout the T-hangar areas as well between the tie-down parking areas on the aprons. The taxiway and taxilane system are depicted on Exhibit 2-1. Taxilane markings for the future G and H hangars are in good condition. Markings for the remaining taxilanes are in fair to poor condition.

5. Airport Pavements

Over the years, a significant investment in airfield pavement has been made at FCI. These pavement sections include both airside facilities such as the runway, taxiways, and aircraft parking apron areas as well as landside facilities consisting of roadways and automobile parking. Airfield pavements are designed, constructed, and maintained to support the critical aircraft loads imposed on them and provide a smooth, skid-resistant surface necessary for the safe operation of aircraft in all weather conditions. Immediately after construction, airport pavements begin a gradual deterioration that is attributable to several factors. Traffic loads in excess of those forecast during pavement design may reduce the useful life considerably. Normal distresses in the pavement structure result from surface weathering, fatigue effects, and differential movement in the underlying sub-base over a period of years. Consequently, airport pavements require continual routine maintenance, rehabilitation, and upgrading.

Pavement conditions were assessed by DOAV in December 2007 for their pavement maintenance management program and again by Delta during the inventory site visit in September 2008. Delta's findings from the site assessment are generally consistent with DOAV's recommendations. The existing condition of the FCI airfield pavements are highlighted in **Table 2-4** and depicted graphically on **Exhibit 2-6**.



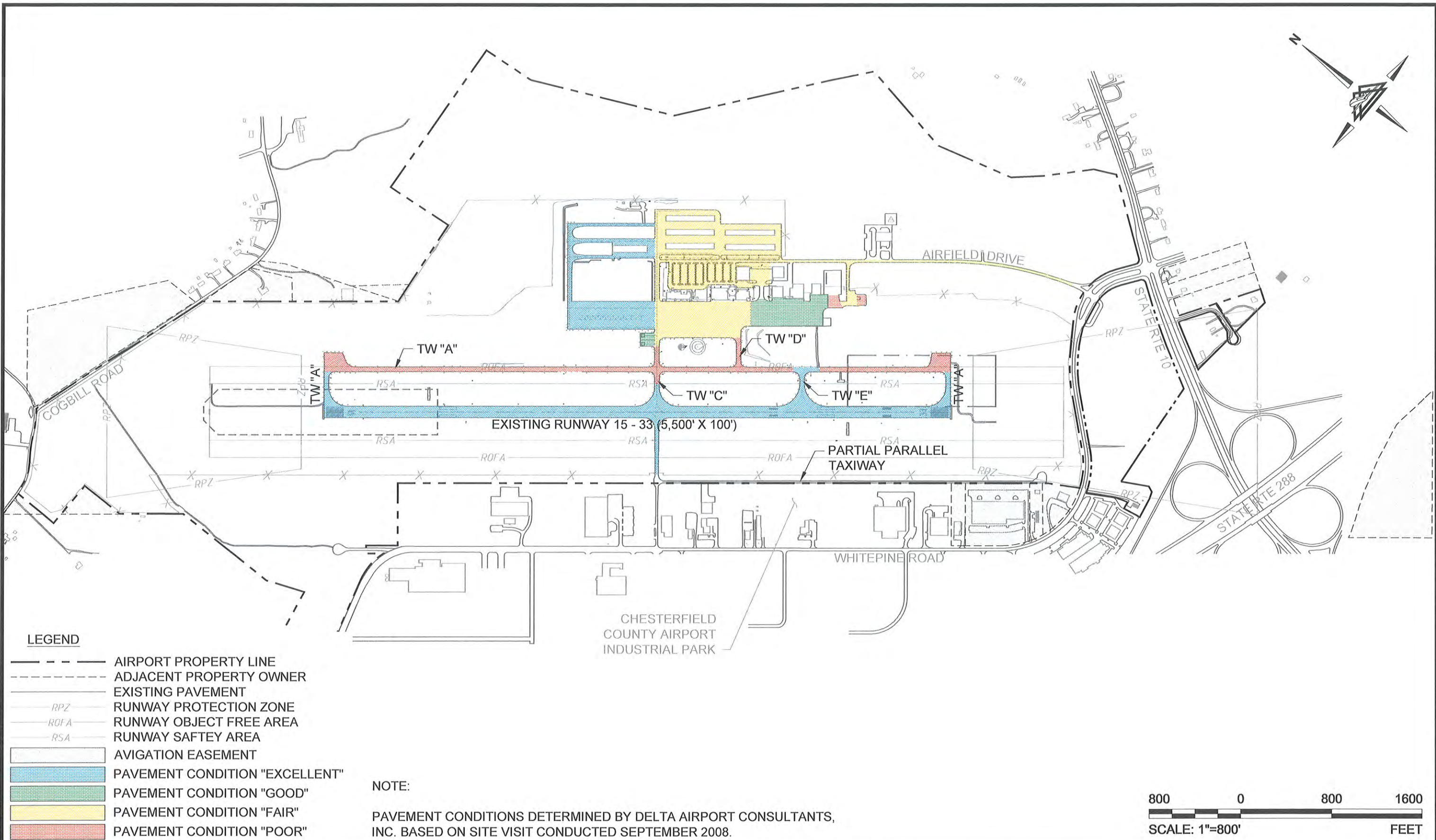
Table 2-4
Chesterfield County Airport
Pavement Condition Summary

Pavement Surface	Length	Width	Pavement Type	Pavement Condition	Comments
Runway 15-33	5,500'	100'	Asphalt	Excellent	Runway/TW rehabilitation in 2007
Taxiway A	5,500'	40'	Asphalt	Poor	Proposed rehabilitation in 2009
Taxiway C	2,400'	35'	Asphalt	Excellent	Section west of Runway -- rehabilitation 2007
		40'		Poor	Section east of Runway -- proposed rehabilitation 2009
Taxiway D	300'	40'	Asphalt	Poor	Proposed rehabilitation in 2009
Taxiway E	375'	40'	Asphalt	Excellent	Runway/TW rehabilitation in 2007
Terminal Apron	760'	320'	Asphalt	Fair	Overlay 1988, seal coat 2002
North Terminal Apron	800'	380'	Asphalt	Excellent	Constructed in 2006
South GA Apron	720'	220'	Asphalt	Good	
Helicopter Parking Area	115'	165'	Asphalt	Good	Constructed in 2002
T-Hangar Taxilanes	Various		Asphalt	Fair/Poor	

Source: Delta Airport Consultants, Inc.



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EXISTING PAVEMENT CONDITIONS CHESTERFIELD COUNTY AIRPORT

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EXHIBIT
2-6

6. Land Use

Chesterfield County's Comprehensive Plan was most recently amended in February 2008 and serves as a mechanism to manage future growth of the county. The airport and its surrounding area are discussed in the county's "Central Area Plan." The plan recognizes that the airport is an "anchor to Chesterfield County's economy, by promoting synergistic relationships between the airport and future industrial activity." The plan recommends that steps be taken to protect the airport from non-compatible land uses that would conflict with airport operations and Section 19-507 of the Code of Chesterfield County details zoning regulations that are in place to protect the Part 77 surfaces.

The airport is currently zoned light industrial which the county defines as "uses that are dependent upon raw materials first processed elsewhere. Limited retail and service uses that are accessory to industrial uses are also permitted when part of an integrated industrial development." Surrounding land uses are also designated light industrial with neighborhood and regional mixed uses to the east. A large area of residential land use is located to the north of airport property.

The primary cause of incompatibility between airports and surrounding communities is aircraft noise. New noise contours will be developed as a part of this Master Plan Update to determine the current extent of land use incompatibility and examine potential impacts throughout the 20-year planning period. **Exhibit 2-7** depicts existing land use in the vicinity of the airport.

Land use around an airport is also a concern within the Runway Protection Zone (RPZ). The FAA prefers that an airport sponsor maintain fee simple ownership for land areas within the defined RPZ area to enhance protection of people and property. Such control includes the clearing and maintenance of incompatible objects and activities. At the present time, FCI does not have controlling interest in a 1.5 acre portion of the existing RPZ on the Runway 15 end and approximately 22 acres within the Runway 33 RPZ.

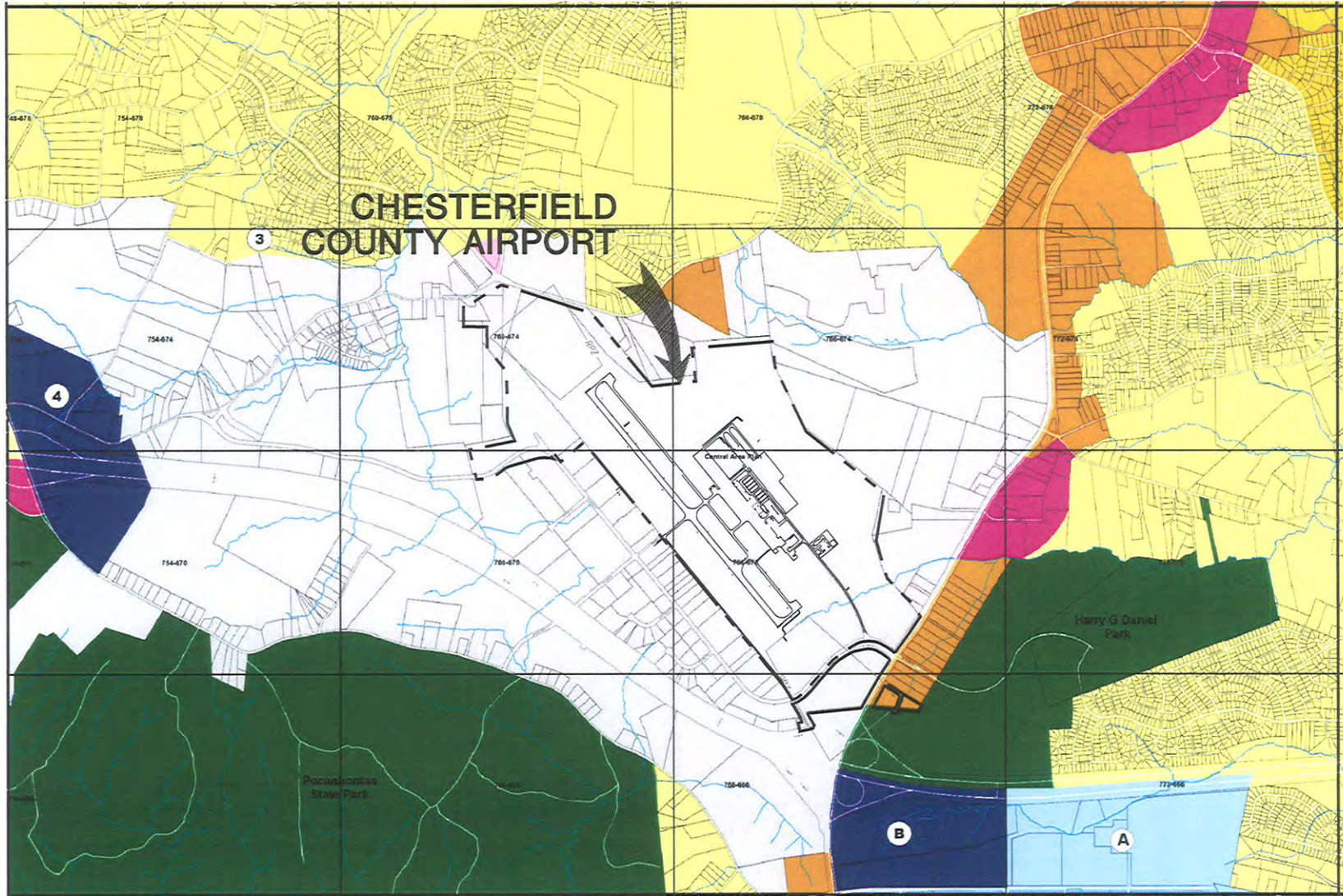


CHESTERFIELD COUNTY, VIRGINIA

LAND USE PLAN MAP 17

KEY
Refer to Plan text for full definition

See Notes Below



- Central Area Plan**
(Adopted Date: January 10, 2011)
- Residential (1.0 - 2.5 D.U.A.)
 - Residential (2.51 - 4.0 D.U.A.)
 - Residential (7.01 D.U.A. or more)
 - Office
 - Mixed Use Corridor
 - Neighborhood Mixed Use
 - Community Mixed Use
 - Regional Mixed Use
 - Light Industrial
 - General Industrial
 - Parks
- PPZ EXISTING RUNWAY PROTECTION ZONE
- EXISTING AIRPORT PROPERTY (APPROX)

SOURCE: CHESTERFIELD COUNTY PLANNING DEPARTMENT (AUGUST 2006)



www.deltaairport.com

EXISTING LAND USE MAP CHESTERFIELD COUNTY AIRPORT

EXHIBIT
2-7

DRAWN BY:

LKH

CHECKED BY:

KSK

SCALE:

NTS

DATE:

OCTOBER 2010

B. TERMINAL AREA DEVELOPMENT

The terminal area for Chesterfield County Airport is located on the east side of airport property and consists of terminal facilities, conventional hangars, T-hangars, a tie-down apron, fueling facilities, and auto parking. An inventory of existing airport buildings and facilities is presented on **Exhibit 2-8**.

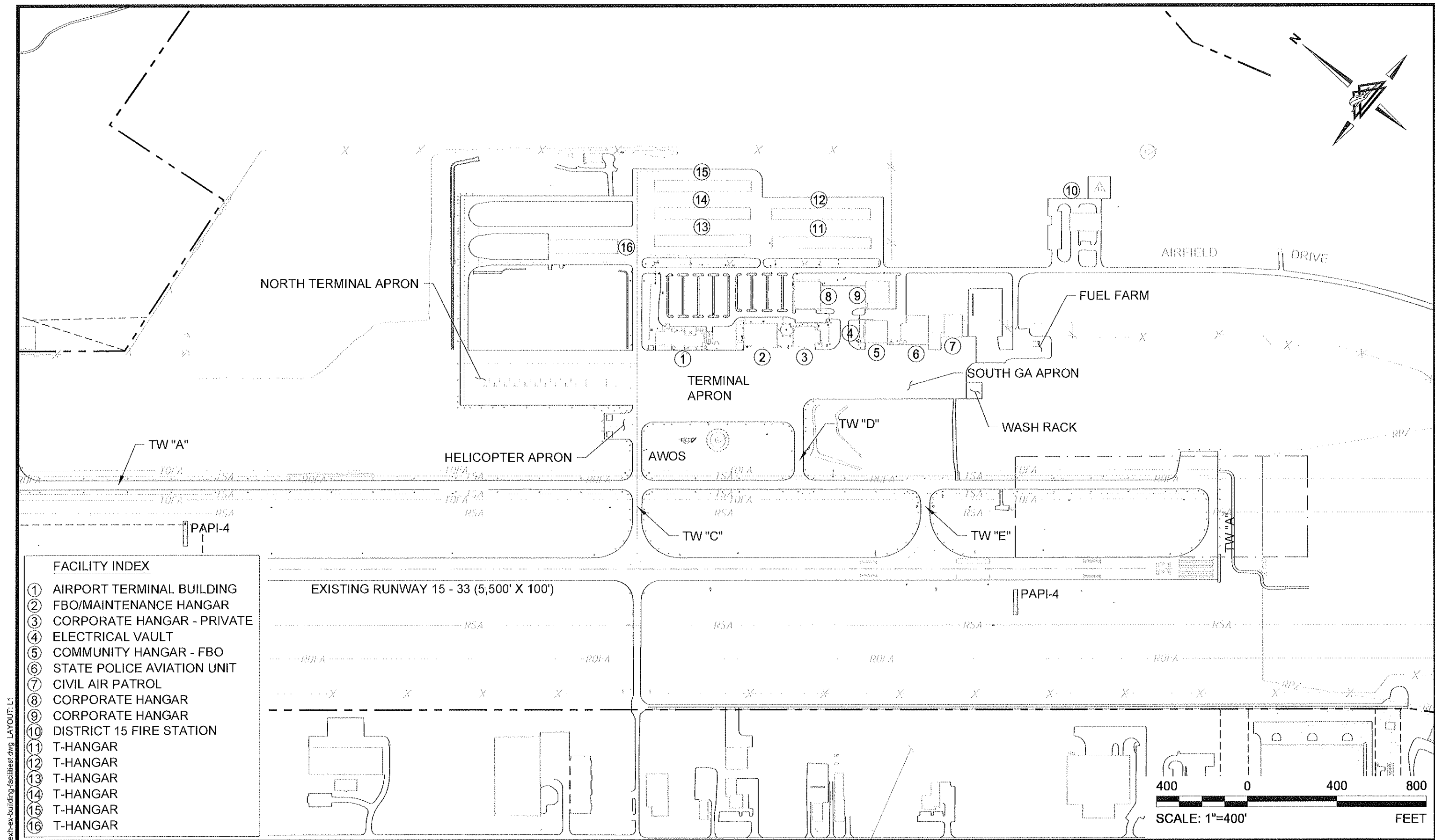
1. Airport Access

The Chesterfield County Airport is located in the south central part of Virginia. The immediate airport vicinity is served by State Routes 10 and 288. Two interstate highways, I-64 and I-95, provide access to other areas in the state and region. Chesterfield is the county seat of Chesterfield County and is located approximately 14 miles south of Richmond, Virginia. Primary access to the airport terminal building and aeronautical services are via State Route 10 (Ironbridge Road) to Whitepine Road to Airfield Drive.

2. Terminal Building

FCI's terminal building was originally constructed in 1976 and expanded/upgraded in 2003. The new portion of the facility is in excellent condition while the older section remains in fair condition. The building is located nearest to Taxiway 'C' and serves as the focal point for the efficient transfer of pilots and passengers between ground transportation and aircraft thereby serving as a gateway to the local community. It includes a passenger lobby area, customer service desk, pilot's lounge with flight planning facilities and a kitchenette. The Kings Korner Restaurant, office space, a conference room, and a classroom for flight training are also located in the building.





DRAWING: 06131-ex-bldg-facilities.dwg LAYOUT: L1



DRAWN BY: LKH						CHECKED BY: KSK						SCALE: 1" = 400'						DATE: OCTOBER 2010					
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3. Automobile Parking

Currently, 136 paved automobile parking spaces are designated for public use at the terminal building area. In addition, 104 spaces are located at the Dominion Aviation hangar and 40 spaces are sited at the Virginia State Police (VASP) hangar. The Civil Air Patrol hangar has 37 parking spaces and Massey Coal Company maintains 22 spaces near its hangar facilities. Of the 339 total spaces available at the airport, 12 are designated as handicap accessible, and two are designated for rental car services. Moreover, approximately 71 parking spaces are currently being added near the North Terminal Apron and are expected to be available for use in 2009.

4. Aircraft Hangars

It is typical for general aviation reliever airports such as FCI to maintain an inventory of both conventional hangars for storage of multiple aircraft of various sizes and types as well as T-hangars which are individually nested structures capable of accommodating one aircraft per unit. T-hangars provide storage of single engine and small twin engine aircraft only, while larger aircraft are generally accommodated in conventional hangars. Currently, six T-hangar structures, consisting of five 20-unit buildings as well as one 10-unit structure are available at FCI and are located east of the terminal building area. Three conventional hangars are located east of the south GA apron. Exhibit 2-8 illustrates the location of all existing hangars at FCI.

5. Aircraft Apron and Tie-downs

Another method of aircraft storage is apron tie-downs. Currently, a total of 85 tie-downs are available at FCI with the terminal apron area containing 38 positions while 27 are located at the north terminal apron area. Finally, an additional 20 tie-downs are located adjacent to the south GA apron. A small corporate aircraft parking apron is located adjacent to the south GA apron and provides access for 2 conventional hangars. The airport also contains a helicopter parking area located off of Taxiway 'C.' Markings on



the helicopter parking area are in good condition. Tie-down markings on the north and central apron are in excellent and good condition, respectively. Markings on the south apron are in fair/poor condition. **Table 2-5** summarizes the area for each apron.

Table 2-5
Chesterfield County Airport
Aircraft Parking Apron Dimensions

Apron Location	Area (square yards)	Dimensions
Terminal Ramp	28,800 SY	810' x 320'
North Terminal Ramp	20,604 SY	760' x 244'
South GA Apron	19,070 SY	715' x 240'
Corporate Apron	2,444 SY	220' x 100'
Helicopter Parking Area	2,108 SY	115 x 165'
Total	73,026 SY	

Note: All area dimensions are approximate. Areas include taxilanes.

Sources: Airport Records
Delta Airport Consultants, Inc.

C. SUPPORT FACILITIES AND SERVICES

This section describes the various support facilities and services at FCI. Services available at the airport include FAA certified aircraft repairs, aircraft hangar rentals, aircraft tie-downs, refueling, and aircraft charter services are provided by a fixed base operator (FBO). Available support facilities include fuel storage and dispensing equipment, fire protection/emergency services, ground support and snow removal equipment storage and an aircraft washrack. In addition, a description of utilities and infrastructure to support these services are also discussed.

Chesterfield County Airport has established minimum standards and requirements for the conduct of commercial aeronautical services and activities. As is the case with many airports, the privilege to sell aircraft fuels and oil services to the general public requires a significant investment by an FBO. Typical requirements for a “full service” FBO may require the operator to provide a terminal area that accommodates pilot and passenger lobby, restrooms, flight planning as well as area for the general public. Adequate parking for automobiles, equipment and aircraft must also be provided. Commercial aeronautical service providers that do not provide such a full range of services are typically considered specialized service operators.



1. Fixed Base Operators (FBOs)

A full service FBO is defined as a full service commercial operator who engages in the primary activity of aircraft refueling and one or more of the following secondary activities: airframe and power plant maintenance, aircraft rental, air charter or taxi, avionics maintenance and sales, and aircraft storage.

Dominion Aviation Services (DAS) serves as the FBO at the airport and operates activities from three separate facilities. The main office is located in the terminal building. Maintenance activities are carried out in a 16,625 square foot hangar facility with offices on the east side of the airport. DAS also operates charter aircraft from a 12,000 square foot corporate hangar (formerly Heilig Meyers) that contains an additional 2,400 square feet of office space. Flight training at FCI has been assumed by Heart of Virginia Aviation.

2. Fuel Storage and Dispensing Equipment

Chesterfield County Airport's fuel farm is located south of the Civil Air Patrol hangar and is accessible from Airfield Drive as well as the south general aviation apron. The farm was constructed in the early 1970s; however, was upgraded in the 1990s to meet EPA standards. The fuel farm contains three 12,000 gallon underground storage tanks (USTs). Two tanks contain jet fuel and the other contains 100LL Avgas. The airport owns and maintains the fuel farm and aircraft fuel is dispensed via trucks owned or leased by the FBO. Markings at the fueling area are in poor condition. **Table 2-6** lists all fuel tanks and trucks located on the airfield.



Table 2-6
Chesterfield County Airport
Fuel Storage and Dispensing Equipment

Equipment	Capacity	Content Use
UST	12,000 gallons	Jet A
UST	12,000 gallons	Jet A
UST	12,000 gallons	Avgas
Truck	2,200 gallons	Jet A
Truck	2,000 gallons	Jet A
Truck	1,200 gallons	Avgas

Note: UST -- Under Ground Storage Tank
Sources: FCI Airport Management
Delta Airport Consultants, Inc. Analysis

3. Ground Support Equipment (GSE) Storage/Snow Removal

Chesterfield County Airport currently maintains one 11-foot and three 8-foot truck mounted plows for use during periods of inclement winter weather at the airport. The airport also owns one small snow blower which is adequate for clearing sidewalks and other small spaces. Maintenance equipment is stored in an airfield maintenance building that is approximately 80 feet by 40 feet in size. The building is located on the terminal apron adjacent to the airport beacon. The County also has trucks normally assigned to the Parks Department that during periods of heavy snowfall are re-assigned on a secondary priority basis to the airport for plowing the runway and taxiways.

4. Wash Rack

Wash racks allow for the collection and proper treatment and discharge of wastewater used to clean airport vehicles and general aviation aircraft. FCI maintains a wash rack that is approximately 70 feet by 70 feet and is located on the south GA apron. The facility has power and water and is linked to the public sanitary sewer system. The facility is in good working condition.

5. Fire Protection / Emergency Services

Although General Aviation (GA) airports such as FCI are not required by the FAA to have specific on-airport rescue or firefighting staffing, FCI does have the equivalent



capability for Index “A” response. GA airports typically receive these services from the local community emergency agencies. Fire protection for FCI is provided by Chesterfield County. County Fire Station No. 15 is located on airport property, southeast of the south GA apron with access from Airfield Drive. The facility was constructed by and is owned by the Chesterfield County Fire Department. The building has three vehicle bays with 12’ wide doors. Its location on airport property allows for fast response and rapid access to all areas on the airport.

Equipment includes one Oshkosh P-19 Rapid Intervention Vehicle, delivered to the county in 1987. This vehicle carries 1,000 gallons of water and 120 gallons of 3% aqueous film forming foam (AFFF). The roof turret is capable of discharging 500 gallons per minute (GPM) and the bumper turret is capable of pumping 250 GPM, simultaneously with this unit. The P-19 is also equipped with a 500 pound Halon 1211 system and the vehicle is staffed 24 hours per day. Replenishment stocks of AFFF and Halon are maintained on-site to return the vehicle service as rapidly as possible. Other equipment at Station No. 15 includes a 1989 Seagrave, a 1,000 GPM pumper with a 500 gallon booster tank and an ambulance. The pumper and ambulance are not dedicated to the airport; however, can respond to aircraft incidents if not performing other duties. Chesterfield County Fire Station No. 13 is located approximately three miles north of the airport on Ironbridge Road and is able to provide support if needed. An emergency helicopter helipad, constructed in 1991, is located adjacent to the fire station.

6. Utilities and Services

Dominion Virginia Power provides electrical power to the airport while Verizon is the provider of telecommunication services. Existing and proposed demand for electrical power and telephone service at the airport is within the capacity currently provided by both public utilities. A backup generator is also available in the event of an emergency to aid with the airport’s power needs. Public water and wastewater services are provided to airport facilities by Chesterfield County.



D. AIRPORT LIGHTING AIDS

This section of the chapter details the airport lighting and visual aids that are available at FCI. These systems aid the pilot in locating and operating in the airport environment.

1. Airport Beacon

The airport beacon is a visual navigational aid used to assist pilots in locating the airport environment using a rotating light with green and white lenses to produce a flashing effect. The airport beacon is mounted atop a tower located between the FBO maintenance hangar and a private, corporate hangar. The beacon was built in 1992 and is in good condition. The airport regularly maintains the beacon; however, reports that some seals are cracking due to age which may necessitate replacement and/or upgrades to this unit.

2. Segmented Circle and Windsock

The segmented circle and lighted windsock includes a series of objects on the ground designed to give visual traffic pattern and wind direction information to pilots in the air. A traffic pattern indicator extends from the landing strip indicator when a right-handed traffic pattern exists. The segmented circle is located off the traffic area with a wind indicator located at its center. Segmentation of the circle is necessary so that it can be readily distinguished from a solid circle which is sometimes used to mark the center of a landing area. The segmented circle at FCI consists of half-sections of concrete pipe painted orange and white. It is currently in fair condition.

Wind indicators pivot in the wind and may be a tetrahedron, wind tee, windcone, windsock or combination thereof. Wind indicators are installed at airports to aid pilots in determining wind direction and approximate intensity which in turn yields take-off and landing information. The windsock and segmented circle for the Chesterfield County



Airport are located between Taxiways 'C' and 'D,' approximately 200 feet east of the Taxiway 'A' centerline. Lighted supplemental windsocks are located at both runway ends. The windsocks are all in good condition.

3. Precision Approach Path Indicators (PAPIs)

Precision Approach Path Indicators (PAPIs) are a system of lights that provide visual descent guidance to a pilot during an approach to a runway in relatively good weather conditions. These lights are typically visible from three to five miles during the day and up to 20 miles or more at night. PAPI light installations are installed in a single row of either two or four light units. The unit is normally installed on the left side of the runway. Each light unit projects a beam of light having a white segment in the upper part and a red segment in the lower part of the beam. The light units are arranged so that the pilot using the PAPI during an approach will see an equal number of red and white lights if on the proper glide path angle. If the approach is too high, the lights will be white; if too low, the lights will be red.

FCI has PAPI installations to assist with approaches to both runway ends. Four-box (light) units are installed on the left side of Runways 15 and 33. The current aiming angles for all units are a standard three degree glide path. The PAPI units are maintained by the airport, which conducts routine monthly inspections on the units. The units were installed in 1999 are in good condition.

4. Runway End Identifier Lights (REILs)

REILs provide a rapid and positive identification of the approach end of a particular runway and assist the pilot as a visual lateral course guidance aid. These lights consist of a pair of synchronized flashing lights, one located on each side of the runway threshold facing the approach path. REILs may be either omni-directional or uni-directional. Runway 15 is equipped with an omni-directional unit. The unit was installed new in



2007 and is in excellent condition.

5. Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR)

Approach lighting systems provide the basic means to transition from instrument flight to visual flight for landing. A MALSR is a configuration of signal lights starting at the landing threshold and extending into the approach area to a distance of 2,400 feet. Runway 33 is equipped with a MALSR system that is in good condition.

6. Runway Edge Lights

Runway edge lights outline the edges of runways during periods of darkness or restricted visibility conditions. These light systems are classified according to the intensity or brightness they are capable of producing, and are identified as High Intensity Runway Lights (HIRL), Medium Intensity Runway Lights (MIRL) or Low Intensity Runway Lights (LIRL). Runway 15-33 is equipped with HIRLs that are currently in good to excellent condition depending on location.

7. Taxiway Edge Lights

Taxiway edge lights are used to outline the edges of taxiways. Similar to runway edge lights, these light systems are classified according to the intensity of light they emit. All taxiways at FCI are equipped with Medium Intensity Taxiway Lights (MITLs). The MITLs are currently in excellent condition.

8. Electrical Vault

The electrical vault at FCI is located adjacent to the FBO maintenance hanger. The facility is approximately 20 feet by 60 feet and accommodates the airport's electrical



needs as well as houses FAA facilities. The vault is in good condition.

9. Control of Airport Lighting Systems

The Chesterfield County Airport is one of many airports in the United States that is not staffed 24-hours per day; therefore, it provides a pilot-controlled airfield lighting system. This system is activated by keying the aircraft's microphone switch several times in rapid succession on a pre-determined and published radio frequency. It provides a greater degree of safety for the pilot and reduces the operating cost and maintenance of the airfield lighting system.

The radio frequency serving this system, also known as the Common Traffic Advisory Frequency (CTAF), eliminates the need for pilots to change frequencies to turn the lights on and allows a continuous listening watch on a single frequency. A CTAF is a frequency designated for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The CTAF frequency at FCI is 123.05 MHz and is published on the instrument approach chart and in other appropriate aeronautical publications.

E. AIRPORT WEATHER CONDITIONS AND SERVICES

Weather is a factor which significantly affects the airfield operating environment. In relation to aircraft operational conditions and the associated aircraft approach activity, weather conditions are comprised of two categories; 1) instrument meteorological conditions and 2) visual meteorological conditions. Instrument Meteorological Conditions (IMC) exist when the pilot operating the aircraft must use all available navigational aids and FAA Instrument Flight Rules (IFR) to operate an aircraft under less than adequate visual (reduced visibility, fog, rain, snow, etc.) weather conditions. Visual Meteorological Conditions (VMC) exist when the pilot operating the aircraft must establish visual contact with the runway and rely on this view to prepare for initial and final approach procedures under FAA Visual Flight Rules (VFR), which



includes alignment with the runway before landing the aircraft.

Airport weather conditions are often monitored by automated observing systems. These systems provide detailed data that is available to pilots via a recorded message accessed by a specified radio frequency or telephone contact. Two such systems are currently in use; 1) Automated Surface Observing System (ASOS) primarily deployed by the U.S. National Weather Service and 2) Automated Weather Observing System (AWOS) which provides similar information, based on specifications from the FAA.

FCI has an AWOS-3 that reports altimeter settings, wind data, temperature, dew point, density altitude, visibility, and cloud/ceiling data. The AWOS-3 frequency is 128.625 MHz and the system is located adjacent to the segmented circle, between Taxiways 'C' and 'D.' FCI's AWOS-3 however has limited function as is not currently connected to the National Weather System Network.

F. INSTRUMENT APPROACH PROCEDURES AND NAVAIDS

This section discusses both visual and electronic Navigational Aids (NAVAIDS) for FCI. There are various types of electronic NAVAIDS that provide specific support to the system of air navigation. NAVAIDS provide enroute navigation support, as well as assistance in performing established instrument approach procedures for the purpose of landing at an airport.

FCI has three published instrument approach procedures to Runway 15-33. Runway 33 has a precision ILS (Instrument Landing System) approach and both Runway 33 and Runway 15 have a non-precision RNAV/GPS approach. Each instrument approach procedure includes a decision height (DH) or minimum descent altitude (MDA) and minimum visibility, beyond which point the pilot must execute a missed approach and re-attempt the landing effort, or divert to another airport. The altitude references are expressed in both MSL (Mean Sea Level) and AGL (Above Ground Level) on published instrument approach charts used by pilots. The visibility minimums for FCI's published approaches vary depending on the approach category of the given aircraft.



The following is a brief description of each NAVAID, and the related procedure, available to support instrument approaches to FCI.

1. Very High Frequency Omnidirectional Range Stations (VOR)

The VOR station forms the basic element of the enroute electronic navigation system in the United States by transmitting a very high frequency (VHF) signal providing azimuth information to the pilot. Since the signal is VHF, it is subject to the line of sight restriction and the range varies with the altitude of the receiving equipment. A VOR located on or near an airport that is used for non-precision approaches is known as a terminal class VOR (TVOR). VOR's can also be co-located with Distance Measuring Equipment (DME), which provides distance information (in nautical miles) from the aircraft to the DME station. VOR/DME equipment used by civilian aircraft was enhanced to support military operations in development of the Tactical Air Navigation (TACAN) system. These TACAN stations were integrated with civil VOR/DME stations and are known as VORTAC stations.

FCI had a VOR to Runway 15 but it was recently cancelled; consequently there is no ground based approach to Runway 15. Air traffic in Chesterfield County historically utilized the Flat Rock VORTAC, located approximately 16 nm northwest of FCI; however, it was taken out of service on September 6, 2008, until further notice. Consequently, the Richmond VORTAC is the only one available and, is located approximately 12 nm northeast of the airport. The Richmond VORTAC operates at 114.1 MHz.

2. Instrument landing System (ILS)

The ILS is designed to provide an approach path for exact alignment and descent of an aircraft on final approach to a runway. The standard ILS, as in service at the Chesterfield County Airport, is a Category I system that consists of a localizer providing lateral



guidance and a glideslope providing vertical guidance. The ILS is used when instrument meteorological conditions (IMC) require the pilot to employ instrument flying rules (IFR). The published ILS approach for Runway 33 is depicted in **Exhibit 2-9**.

3. RNAV/GPS RWY 15 and 33

The Global Positioning System (GPS) is a space-based radio-navigation system. It consists of 24 satellites, which orbit the earth at an altitude of approximately 11,000 miles, and ground stations. GPS provides users with accurate information on position, velocity and time anywhere in the world and in all weather conditions, by cross referencing signals from at least four of the satellites. GPS airport instrument approach procedures can typically be subdivided into three types: The overlay approach, the GPS only approach and the Area-Navigation (RNAV) approach.

The RNAV approach employs a method of aircraft navigation that permits aircraft operation on any desired course within the coverage of station-referenced navigational signals or within the limits of a self-contained system capability. The type of navigation allows a pilot to fly a selected course to a predetermined point without the need to overfly ground based navigation stations. Such area navigation uses 'way points', (computer generated points of reference), thereby providing a flexible routing capability that allows for better utilization of airspace than other navigational systems. When programmed by the pilot, the receiver on-board the aircraft automatically selects appropriate signals from the available satellites and translates these into three-dimensional position, velocity and time references. The published RNAV (GPS) approach procedure for Runway 15 and Runway 33 are shown on **Exhibit 2-10** and **Exhibit 2-11**, respectively.



RICHMOND, VIRGINIA

AL-6066 (FAA)

LOC/DME I-CFU 108.3 Chan 20	APP CRS 331°	Rwy Idg 5500 TDZE 218 Apt Elev 237
--	------------------------	--

ILS or LOC RWY 33 RICHMOND/CHESTERFIELD COUNTY (F/C)

NA For inoperative MALSR, increase S-LOC 33 visibility Cat D to 1. If local altimeter setting not received, use Richmond Intl altimeter setting and increase all DAs/MDAs 40 feet. VDP NA when using Richmond Intl altimeter setting.

MALSR
AS

MISSED APPROACH: Climb to 800, then climbing left turn to 2000 via heading 148° and RIC R-223 to MATOX INT/RIC 16.3 DME and hold.

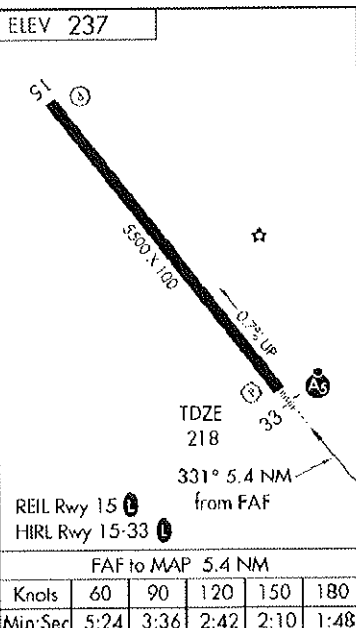
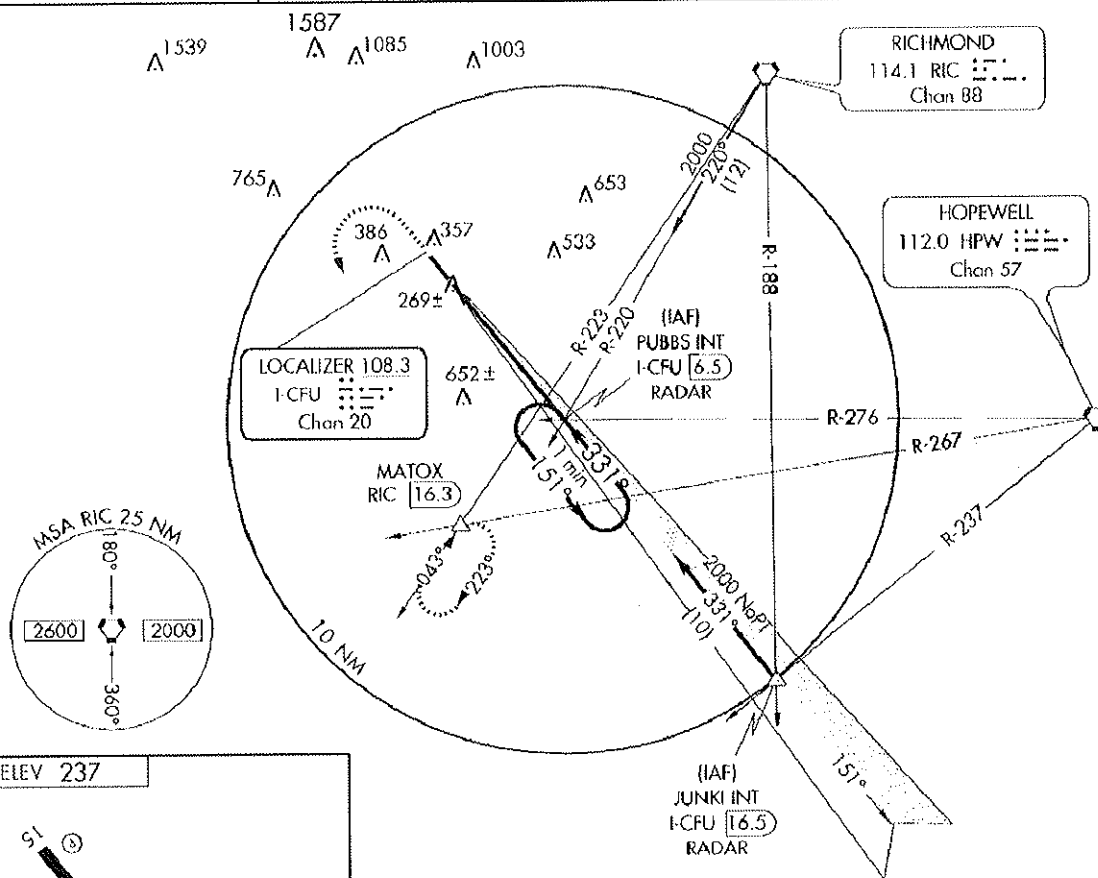
AWOS-3
128.625

POTOMAC APP CON
134.7 307.2

CLNC DEL
124.6

UNICOM
123.050 (CTAF) 0

NE-3, 23 OCT 2008 to 20 NOV 2008



CATEGORY	One Minute Holding Pattern			
	A	B	C	D
S-ILS 33	418-1/2	200 (200-1/2)		
S-LOC 33	520-1/2	302 (300-1/2)		520-3/4 302 (300-3/4)
CIRCLING	720-1	483 (500-1)	720-1 1/2 483 (500-1 1/2)	800-2 563 (600-2)

RICHMOND, VIRGINIA
Amdt 2 08157

RICHMOND/CHESTERFIELD COUNTY (F/C)
37°24'N - 77°32'W
ILS or LOC RWY 33

NE-3, 23 OCT 2008 to 20 NOV 2008

DRAWING: 06131-exh-ILS-LOC-RWY-33.dwg LAYOUT: L-1



ILS OR LOC RWY 33 CHESTERFIELD COUNTY AIRPORT

EXHIBIT
2-9

DRAWN BY: LKH CHECKED BY: KSK SCALE: NONE DATE: OCTOBER 2010

RICHMOND, VIRGINIA

AI-6066 (FAA)

APP CRS
151°
Rwy ldg
TDZE
237
Apt Elev
237

RNAV (GPS) RWY 15

RICHMOND/CHESTERFIELD COUNTY (F01)

NA If local altimeter setting not received, use Richmond Intl altimeter setting and increase all MDAs 40 feet. DME/DME RNP-0.3 NA. VDP NA when using Richmond Intl altimeter setting.

MISSED APPROACH: Climbing right turn to 3000 direct DOCEV and hold.

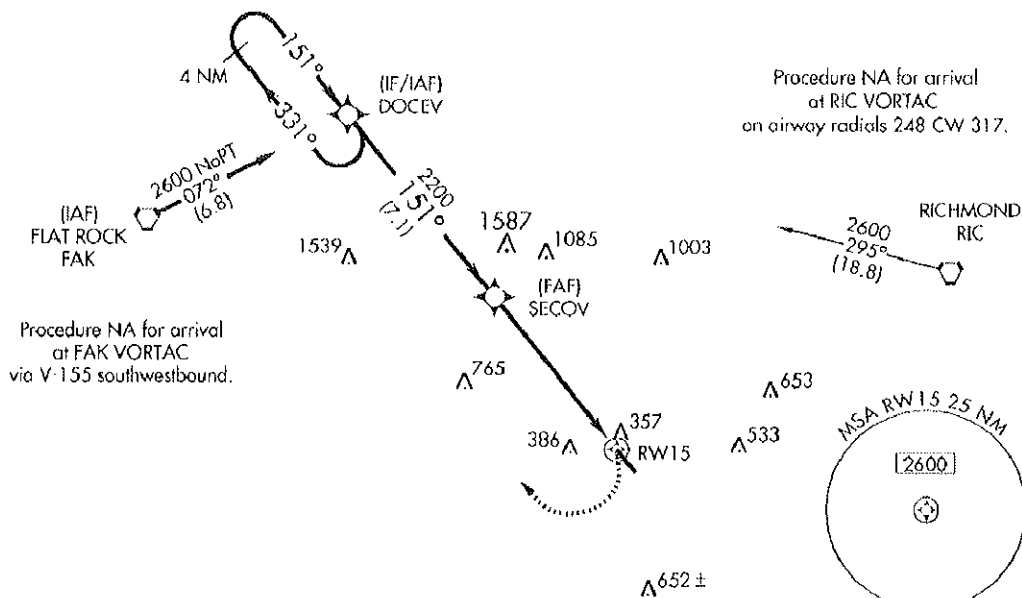
AWOS-3
128.625

POTOMAC APP CON
134.7 307.2

CLNC DEL
124.6

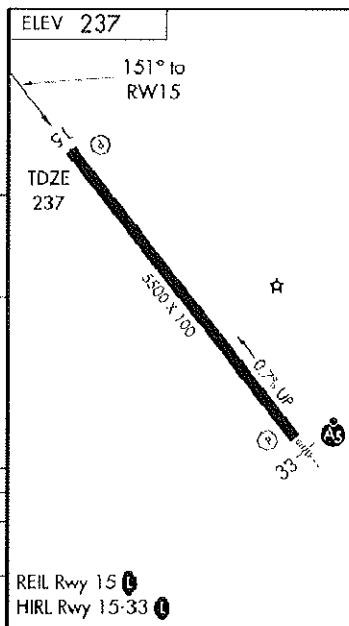
UNICOM
123.050 (CTAF)

NE-3, 23 OCT 2008 to 20 NOV 2008



NE-3, 23 OCT 2008 to 20 NOV 2008

4 NM Holding Pattern		DOCEV		3000 DOCEV	
2600		331°		151°	
		151°		151°	
		2200		1.3 NM to RWY 15	
		3.05° TCH 42		RWY 15	
		7.1 NM		4.7 NM	
		1.3			
CATEGORY	A	B	C	D	
RNAV MDA	680-1	443 (500-1)	680-1½ 443 (500-1½)	680-1½ 443 (500-1½)	
CIRCLING	720-1	483 (500-1)	720-1½ 483 (500-1½)	800-2 563 (600-2)	



RICHMOND, VIRGINIA
Orig 08157

RICHMOND/CHESTERFIELD COUNTY (F01)
37°24'N - 77°32'W

RNAV (GPS) RWY 15



RNAV (GPS) RWY 15

CHESTERFIELD COUNTY AIRPORT

EXHIBIT
2-10

DRAWN BY: LKH CHECKED BY: KSK SCALE: NONE DATE: OCTOBER 2010

RICHMOND, VIRGINIA

AL 6066 (FAA)

WAAS CH 56221 W33A	APP CRS 331°	Rwy Idg TDZE Apt Elev	5500 218 237
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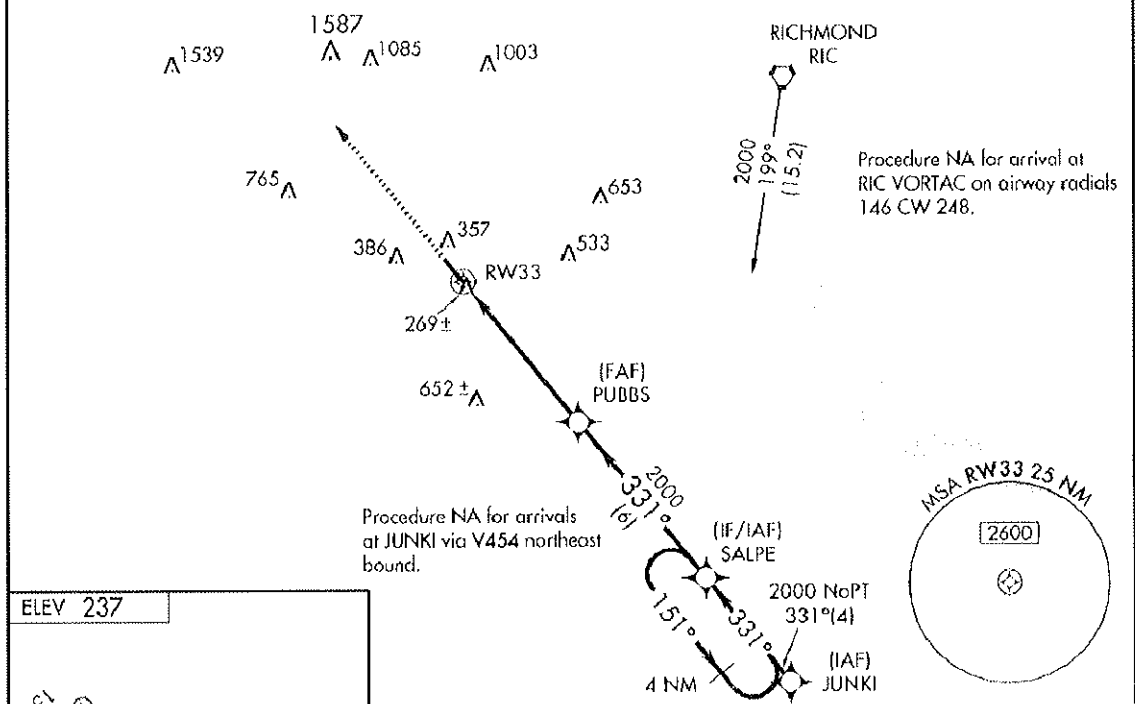
RNAV (GPS) RWY 33

RICHMOND/CHESTERFIELD COUNTY (FCI)

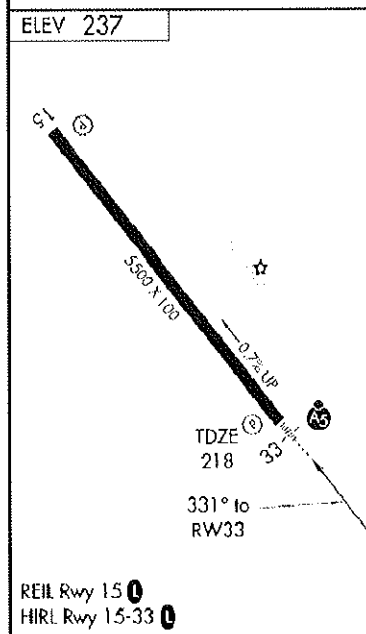
NA For inoperative MALSR increase LPV all Cals visibility to 1. If local altimeter setting not received, use Richmond Intl altimeter setting and increase all DAs/MDAs 40 feet. VDP and Baro-VNAV NA when using Richmond Intl altimeter setting. For uncompensated Baro-VNAV systems LNAV/VNAV NA below -15°C (5°F) or above 48°C (118°F). DME/DME RNP-0.3 NA.	MALSR AS 1000	MISSED APPROACH: Climb to 3000 direct DOCEV and hold.	
AWOS 3 128.625	POTOMAC APP CON 134.7 307.2	CLNC DEL 124.6	UNICOM 123.050 (CTAF) 0



NE-3, 23 OCT 2008 to 20 NOV 2008



NE-3, 23 OCT 2008 to 20 NOV 2008



3000 ↑	DOCEV 	VGSI and RNAV glidepath not coincident.				4 NM Holding Pattern
		PUBBS	SALPE			
		*1.5 NM to RW33		331°	151° →	2000
		*LNAV only		← 331°		GS 3.00° TCH 49
		1.5	3.9 NM	6 NM		
CATEGORY	A	B	C	D		
LPV DA	511-½ 293 (300-½)					
LNAV/ VNAV DA	599-1 381 (400-1)					
LNAV MDA	720-½	502 (500 ½)	720-1	502 (500-1)		
CIRCLING	720-1	483 (500-1)	720-1½ 483 (500-1½)	800-2 563 (600-2)		

RICHMOND, VIRGINIA
Orig-A 08269

RICHMOND/CHESTERFIELD COUNTY (FCI)
37°24'N - 77°32'W

RNAV (GPS) RWY 33



RNAV (GPS) RWY 33 CHESTERFIELD COUNTY AIRPORT

EXHIBIT
2-11

DRAWN BY: LKH CHECKED BY: KSK SCALE: NONE DATE: OCTOBER 2010

G. AIRSPACE

1. Airspace Structure

The airspace over the United States, to an altitude of approximately 60,000 feet MSL (Flight Level – FL600), is separated into two parts, terminal and enroute airspace. Terminal airspace is that area around the nation's major airports extending to a specified altitude that may encompass an area of 60 miles in diameter and include several airports. Enroute airspace is the area within which aircraft transition from one terminal airspace to another. There is no specified bottom altitude for enroute airspace and the top extends to the upper performance limits of civil aircraft. U.S. airspace is further divided into several different categories each having different rules and regulations.

Airspace categories are designated as Class A, B, C, D, E, and G, transition areas and continental control areas. **Exhibit 2-12** illustrates the different classes of airspace. The Class B, C, and D areas are ascribed to Airport Traffic Areas (ATA). Each class of ATA has a given radius, with Classes B and C having extensions (transition areas) to encompass the final portion of an instrument approach procedure.

FCI is located in Class E airspace with a floor of 700 feet above the surface. Class E airspace is a controlled area which includes airspace corridors identified as federal airways, or which accommodate jet traffic at low altitudes. The Class E controlled airspace around the airport starts at 700 feet Above Ground Level (AGL) and extends vertically to 18,000 feet Mean Sea Level (MSL) when it reaches Class A airspace. This area of Class E airspace also includes nearby Dinwiddie County and New Kent County Airports. At the center of this area is the Richmond International Airport which is surrounded by Class C airspace and includes New Kent County Airport. **Exhibit 2-13**, VFR Airspace and Air Traffic Control, depicts the Class E airspace surrounding FCI. **Exhibit 2-14**, IFR Airspace and Air Traffic Control, depicts the established IFR enroute airways and associated reporting points in the vicinity of FCI.



CLASS A (POSITIVE CONTROLLED AIRSPACE, PCA)

CLASS E

(CONTROLLED AIRSPACE)

(TERMINAL CONTROLLED AIRSPACE, TCA)

CLASS B

CLASS C (ARSA)

CLASS G
(UNCONTROLLED AIRSPACE)

CLASS G

CLASS G

CLASS D
(CZ/ATA)

PREPARED BY: DELTA AIRPORT CONSULTANTS, INC.



AIRSPACE CLASSIFICATION CHESTERFIELD COUNTY AIRPORT

EXHIBIT
2-12

DRAWN BY:

LKH

CHECKED BY:

KSK

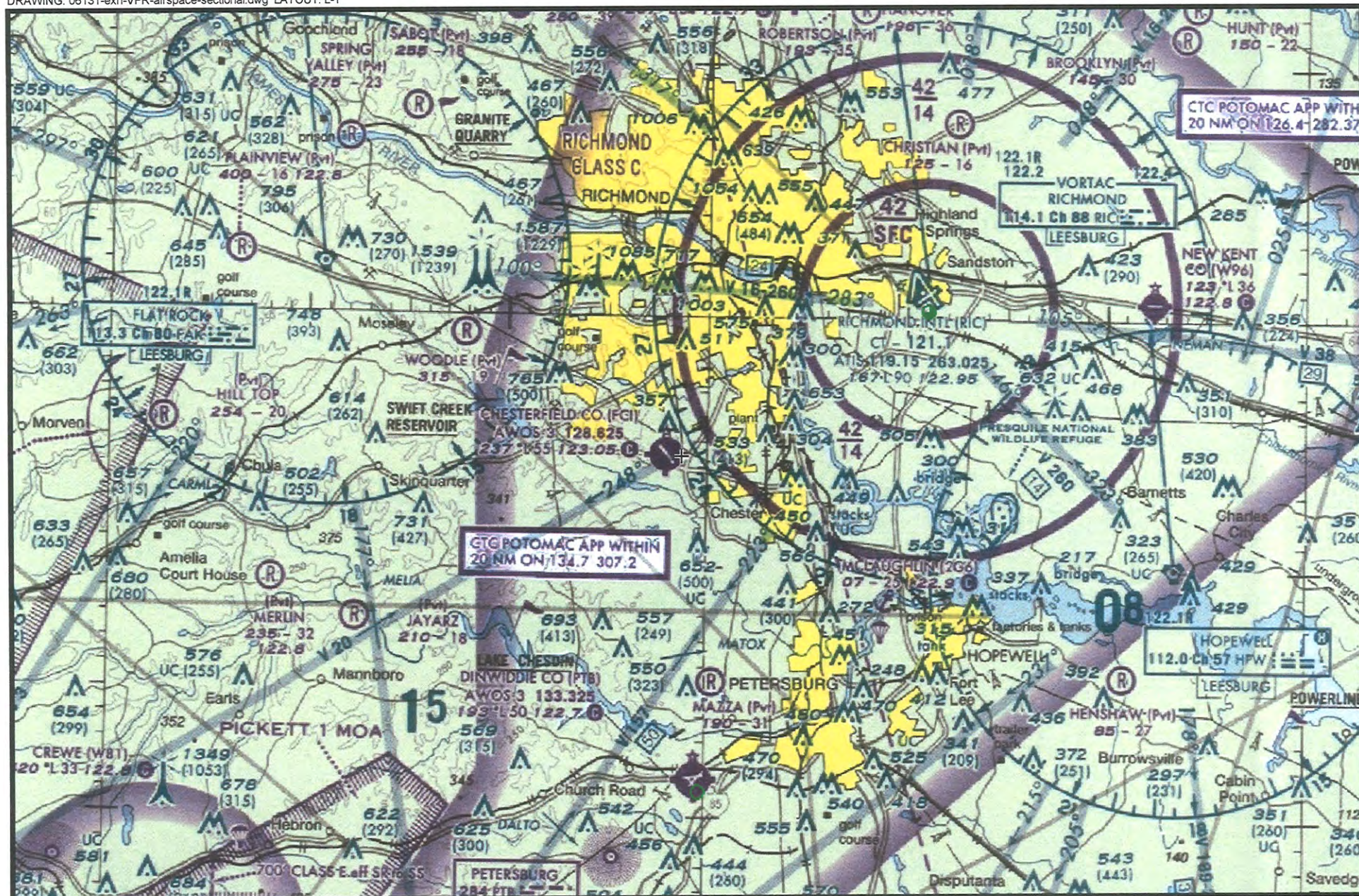
SCALE:

NONE

DATE:

OCTOBER 2010

www.deltaairport.com



www.deltaairport.com

VFR AIRSPACE CHESTERFIELD COUNTY AIRPORT

EXHIBIT
2-13

DRAWN BY:

LKH

CHECKED BY:

KSK

SCALE:

NTS

DATE:

OCTOBER 2010



EXHIBIT
2-14

Air traffic control needs for the Chesterfield County Airport are supported by the Potomac Terminal Radar Approach Control (TRACON) located in Manassas, Virginia.

2. FAR Part 77 Imaginary Surfaces

Federal Aviation Regulation (FAR) Part 77 establishes standards for determining obstructions in navigable airspace; sets forth the requirements for notice to the FAA Administrator of certain proposed construction or alteration; provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace; provides for public hearings on the hazardous effect of proposed construction or alteration on air navigation; and provides standards for establishing antenna farm areas.

FCI is currently designated a class C-II airfield and offers a precision instrument approach (50:1 slope) to Runway 33 and a non-precision instrument approach (34:1 slope) to Runway 15. Any existing fixed or mobile objects are, and future objects may be, obstructions to air navigation if they are of greater height than any of the heights or surfaces outlined in FAR Part 77.23. The determination of whether an obstruction is actually a hazard is accomplished through an aeronautical study conducted by the FAA. The standards apply to all objects, whether manufactured, objects of natural growth, or terrain.

Specifically, the following civil airport imaginary surfaces are established under FAR Part 77 with relation to each airport and to each runway:

- Primary Surface
- Approach Surface
- Transitional Surface
- Horizontal Surface
- Conical Surface



In order to fully protect FCI environs from potential hazards to air navigation, it is important that the obstruction analysis evaluate penetrations based on the Part 77 imaginary surfaces for the non-precision instrument runway and the precision runway. There are known obstructions to the Part 77 surface; further documentation and analysis will be provided later in the study.

H. AIRPORT COMMUNICATIONS

The airport does not have an FAA Air Traffic Control Tower (ATCT); however, the Washington Air Route Traffic Control Center (ARTCC) provides radar separation on all aircraft operating on IFR flight plans within controlled airspace, and principally during the enroute phase of flight. The Potomac Terminal Radar Approach Control (TRACON) located in Manassas, Virginia supports instrument operations to and from the Chesterfield County Airport. Ground control and separation of VFR aircraft operating near the airport is performed by the pilot under visual flight rules.

The airport may be reached by calling the Airport Manager at (804) 743-0771 for general information or operational requests. The airport also has an on-site AWOS-3 that provides up-to-date local weather reporting at (804) 271-8426. Radio communications available at Chesterfield County Airport and within the airport area are listed in **Table 2-7**.

Table 2-7
Chesterfield County Airport
Radio Frequencies

Source	Frequency
CTAF / Unicom	123.05
WX AWOS-3	128.625
Potomac App /Dep Control	134.7
Potomac Clearance Delivery	124.6

Source: AirNav



I. SECURITY

FCI is a general aviation (GA) reliever airport with flights typically operating under Federal Aviation Regulations (FAR) Part 91 and “For Hire” aircraft operated under FAR Part 135. The airport is not subject to the security requirements set forth in FAR Part 139, Class III due to the scheduled operations of small air carrier aircraft. Although no specific mandate for security exists, many GA airports provide a basic level of fencing, gated access and/or personnel to secure the airfield area. The interest in such measures has increased significantly since September 11, 2001 and there is a growing trend that GA airport operators are increasing their level of security awareness.

The Transportation Security Administration (TSA) published “Security Guidelines for General Aviation Airports” in May 2004 to provide owners, operators, sponsors and other entities charged with oversight of GA airports a set of federally endorsed security enhancements and a method for determining when and where these enhancements may be appropriate for implementation. The guidance document provides information and recommendations only and is not considered regulatory or mandatory in nature.

FCI’s security measures combine an extensive security camera system with perimeter fencing and access control via a series of pedestrian and vehicle gates. Access authority for the gates is granted to County personnel as well as key airport tenants and users. Although the airfield is not attended continuously, additional security is provided by regular patrols from the Chesterfield County Police Department and supplemented by state law enforcement agencies. A security plan specific to the airport has been developed and submitted to DOAV.

J. EXISTING AREA AIRPORTS

There are five public use airports, and several private airports, located within a 30 nautical mile radius of Chesterfield County Airport. All but one of these public use airports have asphalt paved runways. Richmond International is the only facility other than FCI that offers major repair



services and a precision instrument approach capability with favorable minimums. **Table 2-8** lists the public use airports and facilities available at each.

Table 2-8
Chesterfield County Airport
Existing Area Public Airports

AIRPORT ASSOCIATED CITY	RUNWAYS	LIGHTING/ APPROACH AIDS	INSTRUMENT APPROACHES	FUEL	BASED AIRCRAFT	ANNUAL OPERATIONS
BLACKSTONE Blackstone, VA	4/22 4,632' x 150' Concrete 1/19 4,032' x 75' Concrete	MIRL, Beacon	RNAV (GPS), NDB or GPS-A, NDB-B	100LL, Jet A	11	3,490
CHESTERFIELD COUNTY Chesterfield, VA	15/33 5,500' x 100' Asphalt	PAPIs, MALSR, REILs, HIRL, Beacon	RNAV (GPS), ILS or LOC	100LL, Jet A	130	82,500
DINWIDDIE COUNTY Petersburg, VA	5/23 5,002' x 100' Asphalt 14/32 3,066' x 50' Asphalt	ODALS, PAPIs, REILs, MIRL, Beacon	RNAV (GPS), LOC, VOR	100LL, Jet A	61	40,557
HANOVER COUNTY MUNICIPAL Ashland/Richmond, VA	16/34 5,402' x 100' Asphalt	PAPIs, REILs, MIRL, Beacon	RNAV (GPS), LOC, VOR	100LL, Jet A	112	31,655
NEW KENT Quinton, VA	10/28 3,600' x 75' Asphalt	PAPIs, REILs, MIRL, Beacon	RNAV (GPS), VOR-A	100LL	38	15,611
RICHMOND INTERNATIONAL Richmond, VA	16/34 9,003 x 150' Asphalt 2/20 6,607' x 150' Asphalt 7/25 5,326' x 100' Asphalt	VASI, MALSR, ALSf2, RCLS, HIRL, TDZL, Beacon VASI, MALSR, REILs, HIRL VASI, REILs, HIRL	ILS or LOC, HI-ILS, ILS (CAT II, III), RNAV (GPS), HI-TACAN, VOR ILS, RNAV (GPS), VOR RNAV (GPS), VOR	100LL, Jet A	75	120, 581

Source: Airport Facility Directory; www.airnav.com; FAA 5010-1 Forms

K. EXISTING NON-STANDARD CONDITIONS

FAA Advisory Circular (AC) 150/5300-13, Airport Design, provides design standards for airport geometrical layout, runway and taxiway/taxilane design and associated elements. The guidance provided by AC 150/5300-13 references many other AC documents for specific applications and is complemented by FAR Part 77.



A key objective of any planning project should be to identify any non-standard conditions that exist on an airport and offer recommendations on actions to achieve full compliance with FAA standards. As highlighted in **Table 2-9**, the existing separation between Runway 15-33 and Taxiway 'A' is the only non-standard condition at the Chesterfield County Airport. Recommendations to address this non-conforming condition will be presented in Chapter Four, Alternatives.

Table 2-9
Chesterfield County Airport
Non-Standard Conditions

Non-Standard Condition	Existing	Standard
Runway/Taxiway 'A' separation	375'	400'
Taxiways A, C, D, & E width	40'	35'

Source: Delta Airport Consultants, Inc.

The current separation from the runway centerline to the taxiway centerline is 375'. FAA AC 150/5300-13 states that standard separation for an ARC C-II facility is 400 feet; however, a modification of standard is on record with the FAA for this issue. The Facility Requirements and Alternative Analysis sections of this report will investigate bringing this issue into compliance with FAA regulations.

L. SUMMARY

The VATSP lists the Chesterfield County Airport as one of eight GA reliever airports in the Commonwealth of Virginia. The existing role of the airport is to serve category C-II aircraft, similar to the Gulfstream III. The airport has a 5,500 foot long runway that is 100 feet wide and is supported by a full length parallel taxiway. A series of connecting taxiways provides excellent access to the aircraft parking aprons, hangars and service centers. The runway is in excellent condition while Taxiway 'A' pavement is scheduled for rehabilitation in 2009. The runway wind analysis conducted through this study indicates that Runway 15-33 provides greater than 95 percent coverage favorable to aircraft operations in IFR conditions, and thus the wind coverage for the airport with the existing runway alignment is within FAA design guidelines.

The airport has one full-service FBO located on the airfield providing a broad range of



commercial aeronautical services to the flying public. A survey of airport tenants and users indicated that the services offered at the airport are adequate, but reflected a desire for additional runway length to support current and projected operations by existing based aircraft as well as additional conventional hangar and T-hangar storage space.

The airport owner and local governmental agencies encourage compatible land use near the airport; yet, aerial surveys indicate penetrations to the Part 77 surfaces. Further analysis will be performed and the findings reported in Facility Requirements, Chapter Four. Ground surveying may be required to confirm any surface penetrations and determine mitigation needs.

Existing conditions that do not meet the minimum criteria for FAA design standards as specified in FAA AC 150/5300-13 have been identified and relate to the separation between the runway and parallel taxiway. Chapter Four, Facility Requirements, will address the feasibility of bringing this issue into compliance.



A. DESCRIPTION OF FORECAST ELEMENTS

The forecast of aeronautical activity at the Chesterfield County Airport (FCI) for the 20-year planning period (2008-2027) is a key element of the Master Plan Update process as it establishes the basis for determining and planning the airfield infrastructure and facility requirements necessary to adequately serve the community's current and future general aviation (GA) needs. The foundation data for the FCI forecast development was collected from local sources such as the County of Chesterfield and the local fixed base operator, as well as from the Virginia Department of Aviation (DOAV) Virginia Air Transportation System Plan Update (VATSP), published in 2003. Additional sources for the forecast include the 1991 Airport Master Plan Update prepared for Chesterfield County, FAA Form 5010-1, Airport Master Record, dated March 2007, as well as the Federal Aviation Administration (FAA) Terminal Area Forecast (TAF). The TAF is a nationwide forecast of aviation activity for individual airports that is updated annually. Aircraft fleet trend projections utilized in the forecast for FCI were derived using the VATSP, FAA Aerospace Forecast FY 2008-2025, and with consideration of local conditions that affect the fleet mix of aircraft operating at the airport. The FAA Aerospace Forecast is updated annually and includes forecasted trend data for the national aircraft fleet, aircraft utilization and all levels of the pilot population. FAA AC 150/5070-6B, *Airport Master Plans*, as well as *Forecasting Aviation Activity by Airport*, a report prepared for the FAA, dated July 2001 provide guidance for conducting forecast development for master plan studies.

Since FCI is a general aviation airport with no air traffic control tower, operational activity data is collected periodically by the fixed base operator (FBO) and observation based estimates. These base data were compared to the operational counts reported on the most recent FAA Form 5010-1, Airport Master Record, dated March 2007, the Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) issued December 2007, and the 2008 DOAV Based Aircraft Summary Report.



The forecasted activity levels are formulated for the short (2008-2012), intermediate (2013-2017), and long range (2018-2027) planning periods and are used in the next chapter to determine facility requirements. Since this Master Plan Update presents long range planning horizons beyond those presented in FAA forecasts, the consultant has interpolated forecast levels for the out years. Growth figures from the FAA Long-Range Aerospace Forecasts FY 2020, 2025 and 2030 were considered in the development of the 2027 forecast, as this is the most reliable data available at the time of forecast preparation. The major forecast elements addressed in this chapter include:

Local Socioeconomic Factors – A community’s socioeconomic character affects its air traffic potential. Local activity that distinguishes the geographic area served by the airport from the aggregate conditions across the region is particularly important in forecasting general aviation activity. The size and composition of the area’s population, and its potential growth rate, are basic ingredients in creating the demand for air transportation services. The discretionary purchasing power available to residents over any given period of time is also a good indicator of consumers’ financial ability to travel by air.

General Aviation Forecast - The general aviation forecast provides projections of general aviation activity for based aircraft by type; local, itinerant and total operations; operations by aircraft type; and estimates of pilots and passengers.

Peak Period Demand - This forecast element provides peak month, peak hour, average day peak, peak month of enplaned passengers and aircraft operations. These measures are critical to the sizing of future airport facilities.

Other Airport Activity Forecasts - Other airport activity forecasts include identifying the existing and future critical aircraft which use the airport on a regular basis. The critical aircraft is used to determine the airport reference code (ARC). In addition, a forecast of the annual volume of instrument approaches will be presented.



B. LOCAL SOCIOECONOMIC FACTORS

Local population and income levels as well as the cost of flying largely determine general aviation activity including the number of based aircraft at an airport. Aviation activity levels result from the interaction of typical supply and demand factors. The demand for aviation is primarily a function of demographic and economic activity within the region the airport serves.

Census data indicated that the population of Chesterfield County experienced an average annual growth rate of 2.4 percent from 1990 to 2000, a rate higher than that of the state of Virginia for the same period. The 2000 Census reported that Chesterfield County was the fourth largest county in the Commonwealth of Virginia and contained approximately 4 percent of the State's total population. Chesterfield County's per capita personal income remained above both the Richmond Metropolitan area and state as reported in the County's 2008 Chesterfield County Business Report while the County's unemployment rate has remained consistently below the state and national rates. The County's population, income and employment are anticipated to maintain moderate growth throughout the 20-year planning period, and as such, are positive indicators for the continued increase in demand for aviation services at the airport. A summary of population projections for the county, state, and country are depicted in **Table 3-1**.

Table 3-1
Chesterfield County Airport
Population Projections

	2000	2010	2020	2030	% Change 2000-2030
United States	281,421,906	308,809,416	336,196,916	363,584,435	29.2%
Virginia	7,078,515	7,994,016	8,909,517	9,825,019	38.8%
Chesterfield County	259,903	317,800	370,704	426,104	63.9%

Sources: U.S. Census Bureau, Population Division Interim State Population Projections, 2005.
Chesterfield County Planning Department, January 2009.



C. GENERAL AVIATION FORECAST

It is important to note the dramatic changes in the general aviation industry over the past 20 years when developing forecasts for the next 20 years. Although the large business aircraft sector of the general aviation industry has remained viable, issues of product liability in the early 1980s forced the cost of owning and operating a general aviation aircraft to steadily increase. The liability issue forced aircraft manufacturers to cease production of single engine and many light twin engine model aircraft. The passage of the General Aviation Revitalization Act of 1994 revived the industry with great success, including the creation of more than 250,000 new jobs, a 100 percent increase in GA aircraft production, a 150 percent increase in the research and development of general aviation aircraft and hundreds of thousands of new pilots. The large business sector remains strong, while the single and light twin market is once again showing signs of positive growth. This trend is projected to continue, assuming no extreme new regulation of general aviation aircraft and pilots occurs as the result of the events of September 11, 2001.

This section projects future growth based on key indicators of the strength of the local general aviation community. The general aviation forecasts determined in this section include:

- Based Aircraft by Type
- Annual Operations
- Local/Itinerant Operations
- Operations by Fleet Mix / Aircraft Type
- Pilots and Passengers

1. Based Aircraft by Type

The projected mix of based aircraft was generated to reflect state trends for general aviation and was derived directly from the 2003 VATSP Update. The 2003 VATSP growth forecasts were applied to FCI data. Results indicate that the general aviation



aircraft fleet is anticipated to increase at average annual rates of 1.4 percent for the period 2005 through 2015 and 1.2 percent for the period 2015 through 2020.

In comparison, FAA forecasts expect the general aviation aircraft fleet to increase at an average annual rate of 1.4 percent for the period 2007 through 2025, excluding ultralight and newly manufactured light sport aircraft. The fleet of turbine aircraft is expected to increase at a greater rate than that of piston aircraft, as a result of the dramatic growth in fractional ownership and a shift from commercial air travel to corporate/business air travel by many business travelers and corporations. Turbojet aircraft are projected to increase at 5.6 percent annually. The FAA forecast also expects total hours flown in the turbojet aircraft segment to increase by 7.7 percent annually throughout the planning period.

This trend is largely attributable to the number of aircraft being operated by fractional ownership providers. Fractional ownership providers maintain a fleet of aircraft, provide crew, and calculate the logistics of the flight for customers who purchase share in the aircraft equivalent to the hours of flying time per year. This system provides the owner with a flexible and convenient way to fly at a fraction of the cost of fully owning a GA aircraft. While the average corporate jet utilization is approximately 350 hours per year, it is estimated that utilization for fractional ownership aircraft is about 3.5 times as much.

Chesterfield County's role in the national air transportation system as a designated reliever airport for the Richmond International Airport has already made it a facility of choice for large turboprop and turbojet operators and its location and service role ensure that it will meet or exceed average industry growth projections.

A review of the DOAV Based Aircraft Summary Reports from 2004 – 2009 are presented in **Table 3-2**. Reports filed for FCI in the planning base year 2008, indicated a based aircraft count of 130. This count is consistent with the FAA Terminal Area Forecast (TAF). Please see **Table 3-3** for a comparison of the forecasts aligned with the planning horizons of the current Master Plan effort.



Table 3-2
Chesterfield County Airport
Historic Based Aircraft Summary

Aircraft Type	2004	2005	2006	2007	2008	2009
Ultra-light	0	0	0	0	0	0
Glider	0	0	0	0	0	0
Single Engine	92	97	104	103	97	93
Multi-Engine Piston	22	21	22	14	18	17
Multi-Engine Turbo-Prop	10	6	7	7	3	6
Business Jet	7	7	8	9	7	10
Helicopter	2	2	3	4	4	4
Other	1	2	1	1	1	1
TOTAL	134	135	145	138	130	131

Source: DOAV Annual Based Aircraft Survey, Summary Report.

Table 3-3
Chesterfield County Airport
Based Aircraft Forecast Comparison

	BASE	FORECAST			
	2007	2008	2013	2018	2027
2003 VATSP ¹	131	132	135	138	144
FAA TAF	134	134	134	134	134
2008 Master Plan Update ²	130	130	137	143	155
Percent Difference (2008 MPU/TAF)	-3.1%	-3.1%	2.2%	6.3%	13.5%

Note: ¹ Figures were extrapolated from 2003 VATSP to match current planning horizons for purposes of comparison.

² 2007 figures from actual airport records reported to DOAV on January 23, 2008

Sources: FCI DOAV Based Aircraft Summary Report - FY 2007
 Virginia Air Transportation System Plan Update (VATSP) - 2003
 FAA Terminal Area Forecast (TAF)
 Delta Airport Consultants, Inc. Analysis

As noted previously, both population and employment for Chesterfield County continue to grow at a rate significantly higher than the state. Growth in median income levels should also translate to increased operational activity and a greater number of local pilots.

The excellent aeronautical services offered at the Airport, the GA terminal building, the full service fixed base operator (FBO), and the County's continued commitment to developing the facility as a first class GA airport are all key indicator's of the airport's



potential for continued growth. Enhancements to the airfield currently under consideration by the County include the extension of Runway 15-33 as appropriate to serve the airport's critical aircraft, and will evaluate the viability of a parallel and/or crosswind runway.

In the forecasting process, the based aircraft fleet mix is used to determine operational fleet mix forecasts. Fleet mix type categories include: single engine, multi-engine piston, multi-engine turboprop, turbojet and rotorcraft. The fleet mix forecasting process typically involves the following steps:

- a. The existing based aircraft fleet mix is identified by FAA Form 5010-1, Airport Master Records, FBO records and/or visual observation;
- b. Growth rates for each aircraft type from the forecast of general aviation fleet mix for the United States is calculated;
- c. The fleet mix growth rates are applied to the based aircraft forecasts for each planning period and;
- d. Consideration of any special local factors that may increase or decrease the projections in total or by individual type category is weighed.

Using this method, the based aircraft fleet can be projected using national and regional trends of active aircraft fleet mix for comparison purposes. The forecast of based aircraft by type for the Chesterfield County Airport, over the 20-year planning period, anticipates a trend similar to the national forecast. **Table 3-4** presents the based aircraft forecast figures.



Table 3-4
Chesterfield County Airport
Forecast of Based Aircraft by Type

YEAR	SINGLE ENGINE PISTON	MULTI- ENGINE PISTON	MULTI- ENGINE TURBO- PROP	TURBOJET	ROTORCRAFT	OTHER	TOTAL
Base							
2007	97	18	3	7	4	1	130
Forecast							
2008	91	18	5	10	5	1	130
2013	96	18	5	12	5	1	137
2018	100	18	5	14	5	1	143
2027	108	18	5	18	5	1	155

Sources: FCI 2008 Based Aircraft Summary Report as reported to DOAV January 2009.
 FAA Form 5010-1, Airport Master Record - March 2007
 Virginia Air Transportation System Plan Update (VATSP) - 2003
 Delta Airport Consultants, Inc. Analysis

As reflected in the FAA Aerospace Forecast and the FAA Long Range Aerospace Forecasts, the most aggressive growth category is focused on the turboprop and turbojet aircraft. Chesterfield County Airport is realizing the full effect of the growing demand for business jet aircraft. As noted in Table 3-2 previously, based turbojet aircraft are forecast to double during the 20-year planning period.

The FBO management indicates that itinerant business jet traffic continues to increase, noting that major corporate aircraft owners routinely use FCI. The impact of the business jet activity on the operational forecasting for FCI is significant and is discussed in greater detail later in this chapter with regard to defining the critical aircraft for the airport.

2. Annual Operations

An aircraft operation is defined as either a take-off or landing. A touch and go (landing and take-off without a full stop) is counted as two operations. This section quantifies



total general aviation operations, while the next subsection identifies the share of total operations attributed to local and itinerant operations.

The forecast of general aviation operations was derived directly from the 2003 VATSP Update and FAA Form 5010-1, Airport Master Record, dated March 2008. Comparisons were made between the VATSP forecast operations and forecast data from the FAA Terminal Area Forecast (TAF). **Table 3-5** presents a comparison of the forecast to the VATSP update, as well as the TAF. **Table 3-6** presents the detail of aircraft operations as defined for general aviation, air taxi, and military aircraft.

FAA Long Range Aerospace Forecasts expect the general aviation aircraft fleet to increase at an average annual rate of 1.3 percent for the period 2005 through 2030. The forecast of general aviation operations for the Chesterfield County Airport, over the 20 year planning period, anticipates a trend similar to the national forecast.

Table 3-5
Chesterfield County Airport
Comparison of Forecasted Aircraft Operations & Percent Average Annual Growth Rate

	BASE			FORECAST					
	2007	2008	%	2013	%	2018	%	2027	%
2003 VATSP	56,348	57,124	1.4%	61,004	1.3%	65,036	1.3%	72,949	1.3%
FAA TAF	82,500	82,500	0.0%	82,500	0.0%	82,500	0.0%	82,500	0.0%
2008 Master Plan Update	82,500	83,597	1.3%	89,306	1.3%	95,218	1.3%	106,860	1.3%
Percent Difference (2008 MPU/TAF)	0%	1%		8%		13%		23%	

Note: Figures were extrapolated from 2003 VATSP to match current planning horizons for purposes of comparison.
2008 Master Plan Update data was developed using 5010-1 base data and applying VATSP growth rate.

Sources: Virginia Air Transportation System Plan Update (VATSP) - 2003
FAA Form 5010-1, Airport Master Record - March 2007



Table 3-6
Chesterfield County Airport
Forecast of Aircraft Operations & Percent Average Annual Growth Rate

	BASE			FORECAST					
	2007	2008	%	2013	%	2018	%	2027	%
Total Operations	82,500	83,597	1.3%	89,306	1.3%	95,218	1.3%	106,860	1.3%
General Aviation ¹	81,500	82,597	1.3%	88,196	1.3%	93,988	1.3%	105,330	1.3%
Air Taxi ²	750	750	0.0%	860	2.7%	980	2.7%	1,280	2.7%
Military	250	250	0.0%	250	0.0%	250	0.0%	250	0.0%

Note: ¹ Growth rates were interpolated from 2003 VATSP
² Growth rate source: FAA Long Range Forecast (2008 - 2025)

Sources: Virginia Air Transportation System Plan Update (VATSP) - 2003
FAA Form 5010-1, Airport Master Record - March 2007

A review of operations per based aircraft (OPBA) at the forecast milestones is also helpful in understanding the anticipated growth rate. **Table 3-7** provides the OPBA during the planning period which represents an annual growth rate of approximately 0.3 percent.

Table 3-7
Chesterfield County Airport
Operations Per Based Aircraft (OPBA)

	2008	2013	2018	2027
Total Operations	83,597	89,306	95,218	106,860
Total Based Aircraft	130	137	143	155
OPBA	643	652	666	689

Source: Delta Airport Consultants, Inc. Analysis

3. Local/Itinerant Operations

Aircraft operations are classified into two broad types: local and itinerant. A local operation is defined as a take-off or landing performed by an aircraft that:

- a. operates in the local traffic pattern or within sight of the airport;
- b. is known to be departing for, or arriving from, flights in a local practice area located within a 20-mile radius of the airport; or



- c. executes simulated instrument approaches or low passes at the airport.

Itinerant operations are defined as all aircraft operations other than local operations. The local/itinerant split is useful as one indicator in evaluating an airport's overall capacity. For instance, if there are a large percentage of local operations, this would typically indicate the airport has a significant level of training activity.

The local/itinerant division of total operations for the Chesterfield County Airport based on FAA Form 5010-1, Airport Master Record, as filed for FCI March 2007 is 84 percent (local)/16 percent (itinerant). This ratio is consistent with the FAA Terminal Area Forecast. The ratio is expected to remain constant throughout the planning period.

Table 3-8 presents the local/itinerant operational counts for the planning period horizons. With Air taxi and military operations withdrawn from the equation, all of which are itinerant, the ratio for GA operations alone is 15 percent local and 85 percent itinerant.

Table 3-8
Chesterfield County Airport
Local/Itinerant Operations

	BASE			FORECAST					
	2007	2008	%	2013	%	2018	%	2027	%
Total Operations ¹	82,500	83,597	1.3%	89,306	1.3%	95,218	1.3%	106,860	1.3%
Local Operations									
- general aviation	33,000	33,439	1.3%	35,722	1.3%	38,087	1.3%	42,744	1.3%
Itinerant Operations									
- general aviation	48,500	49,158	1.4%	52,474	1.3%	55,901	1.3%	62,586	1.3%
- air taxi	750	750	0.0%	860	2.7%	980	2.7%	1,280	2.7%
- military	250	250	0.0%	250	0.0%	250	0.0%	250	0.0%

Note: ¹ Growth rates were interpolated from 2003 VATSP

Sources: Virginia Air Transportation System Plan Update (VATSP) - 2003
FAA Long-Range Aerospace Forecasts FY 2020, 2025, 2030



4. Operations by Fleet Mix / Aircraft Type

The FAA Aerospace Forecast 2008-2025 indicates a projected trend in operations toward a heavier, more sophisticated aircraft fleet, and the Long Range Aerospace Forecast, through 2030 anticipates this trend to continue throughout the planning period for FCI. It is expected that future GA operations by aircraft type will generally reflect the based aircraft forecast, but include an increasing number of turboprop and turbojet operations. The FCI forecasted operational fleet mix for general aviation aircraft was developed based on discussions with the airport, observed conditions, and an analysis of the 2003 VATSP Update.

Discussions with the airport regarding the recent trends in the operational fleet mix indicate that both itinerant and based business jet activity is increasing. Additionally, flight training services offered by Heart of Virginia Aviation, is contributing to increased local operations at the airport. With consideration of these factors, a base operational fleet mix was developed that is representative of the mix that exists today. The forecast mix was then developed for each horizon of the planning period using the operations forecast from the 2003 VATSP Update. **Table 3-9** presents the operational fleet mix forecast, inclusive of air taxi and military operations.



Table 3-9
Chesterfield County Airport
Operations by Aircraft Type - Distribution Comparison

YEAR	SINGLE ENGINE PISTON	MULTI- ENGINE PISTON	MULTI-ENGINE TURBO-PROP	TURBOJET	ROTORCRAFT	TOTAL
Base						
2007	68%	9%	7%	12%	4%	100%
Forecast						
2008	68%	9%	7%	12%	4%	100%
2013	68%	9%	7%	12%	4%	100%
2018	67%	9%	7%	13%	4%	100%
2027	67%	9%	7%	13%	4%	100%

Note: Includes Air Taxi & Military

Sources: Virginia Air Transportation System Plan Update (VATSP) - 2003
Delta Airport Consultants, Inc. Analysis

Table 3-10 illustrates the distribution of forecast operational activity given the aircraft type allocations noted above.

Table 3-10
Chesterfield County Airport
Operations by Aircraft Type

YEAR	SINGLE ENGINE PISTON	MULTI- ENGINE PISTON	MULTI-ENGINE TURBO-PROP	TURBOJET	ROTORCRAFT	TOTAL
Base						
2007	55,930	7,402	5,758	9,870	3,540	82,500
Forecast						
2008	56,676	7,501	5,834	10,002	3,584	83,597
2013	60,558	8,015	6,234	10,687	3,812	89,306
2018	63,628	8,547	6,648	12,346	4,049	95,218
2027	71,429	9,595	7,463	13,859	4,514	106,860

Note: Figures include military operations as rotorcraft

Sources: FAA Form 5010-1, Airport Master Record - March 2007
Virginia Air Transportation System Plan Update (VATSP) - 2003
Delta Airport Consultants, Inc. Analysis



5. Pilots and Passengers

Forecasts of annual general aviation enplaned passengers play an important role in determining such landside facilities as the general aviation terminal building size and the amount of automobile parking areas. This activity is often ignored due to the lack of historical data. To forecast general aviation enplaned passengers, an aircraft occupancy rate is typically multiplied by the number of departures from the airport. The Aircraft Owners and Pilots Association (AOPA) estimates that an average of 2.5 passengers per general aviation departure is a reasonable estimate of GA aircraft occupancy. For this study, this factor was applied to all forecast itinerant departures and 50 percent of local departures (to account for touch and go training that does not add to landside facility use) in order to tabulate a forecast of general aviation enplanements.

General aviation pilots and passengers include those traveling for corporate/business, charter, air taxi, and other transient departures except for any regularly scheduled commercial airline departures. **Table 3-11** presents the total number of pilots and passengers for the planning period.

Table 3-11
Chesterfield County Airport
Pilots and Passengers Forecast

YEAR	PERSONS/ GA FLIGHT	TOTAL DEPARTURES	ANNUAL PILOTS AND PASSENGERS
Base			
2007	2.5	41,125	102,813
Forecast			
2008	2.5	41,674	104,185
2013	2.5	44,528	111,320
2018	2.5	47,484	118,710
2027	2.5	53,305	133,263

Note: Figures do not include military operations

Sources: Delta Airport Consultants, Inc. Analysis



D. PEAK PERIOD DEMAND

Peak period operations are a key element in evaluating facility requirements during periods of high demand. Peak operations drive the space and facility requirements required to meet forecasted demand. General aviation facility needs are related to peak period activity and the most common and useful peaking characteristic of an airport is peak hour activity. Typically, non-towered general aviation airports do not keep consistent records of peak period activity. Thus, an industry standard accepted methodology for estimation is used to predict peak period activity that does not require a census of hourly operations totals and includes the following steps:

- Peak Month - Peak month operations are calculated assuming that the peak month is 10 percent busier than the average month ($\text{annual operations}/12 \times 110\%$).
- Average Peak Day - Average peak day operations are defined as the average day during the peak month. It is calculated by dividing the peak month by 30.
- Peak Hour - Peak hour operations represent the highest number of operations during the busiest hour of an average day during a peak month. Peak hour operations are assumed to be 15 percent of the average peak day.

Table 3-12 presents the forecasted peak period general aviation operations during the planning period.



Table 3-12
Chesterfield County Airport
General Aviation Operations Peak Period Forecast

YEAR	ANNUAL	PEAK MONTH	PEAK DAY	PEAK HOUR
<u>Base</u>				
2007	82,500	7,563	252	38
<u>Forecast</u>				
2008	83,597	7,663	255	38
2013	89,306	8,186	273	41
2018	95,218	8,728	291	44
2027	106,860	9,796	327	49

Sources: FAA Form 5010-1, Airport Master Record - March 2007
 Virginia Air Transportation System Plan Update (VATSP) - 2003
 Delta Airport Consultants, Inc. Analysis

E. OTHER AIRPORT ACTIVITY FORECASTS

Other airport activity forecasts not previously described are presented in this section. Activity evaluated in this section includes defining the future critical aircraft utilizing each runway of the airport and projecting future annual instrument approaches.

1. Critical Aircraft

The determination of the future critical aircraft at Chesterfield County Airport will be useful to establish the airport reference code (ARC) for the airport. The critical aircraft is defined as the aircraft or family of aircraft with the largest wingspan and highest approach to landing speed that uses the airport on a regular basis. The FAA defines regular basis as more than 500 itinerant operations a year. In some cases, the critical aircraft may be two different aircraft where one aircraft establishes design criteria based on the largest wingspan and another establishes design criteria based on the highest approach to landing speed.



The first step in identifying the critical aircraft is to review the aircraft currently based at the airport. **Table 3-13** lists the based turboprop and turbojet aircraft at the Chesterfield County Airport.

Table 3-13
Chesterfield County Airport
Based Turbojet Aircraft (2008)

AIRCRAFT	QUANTITY
Cessna Citation 501/525/550/560	6
British Aerospace BAe125 800	1
Canadair Challenger 600	1
Beech Premier	1
Raytheon Hawker 800XP	1

Source: FCI Local Records – 2008

The growing itinerant traffic and diversity of business jets that FCI now receives however requires a broader analysis of the operational requirements for those aircraft. As mentioned in Chapter One, the critical family of aircraft for the Chesterfield County Airport during the current planning period (2008-2027) is the medium business jet, similar to the Challenger 604 and Hawker 800 type aircraft. Aircraft such as the Challenger 604 and Hawker 800 represent approach category ‘C’ aircraft and comprise approximately 10,000 of the current and forecasted annual operations. An analysis of other business jet aircraft in the FCI operational fleet revealed that more than 50 percent of the total business jet operations involve aircraft with Group II or greater wingspan characteristics, including the Citation Sovereign and the Gulfstream IV.

2. Instrument Approaches

An instrument approach is an approach to an airport utilizing aircraft instrumentation and navigational facilities when actual instrument meteorological conditions exist. The volume of instrument approaches at Chesterfield County Airport has been difficult to measure since the airport has no air traffic control tower that would typically record the



approaches. Aircraft performing instrument flight procedures at the airport are under guidance from the Potomac Terminal Radar Approach Control (TRACON) located in Manassas, Virginia.

Due to the lack of reliable historical data regarding FCI instrument approach procedures, the demand for instrument approaches has been estimated based on historical averages at other airports and similar conditions. It is estimated that instrument approaches will average 2.5 percent of annual operations. The forecast of instrument approaches is presented in **Table 3-14** for each planning horizon.

Table 3-14
Chesterfield County Airport
Instrument Approaches

	BASE	FORECAST			
	2007	2008	2013	2018	2027
Annual Operations	82,500	83,597	89,306	95,218	106,860
Instrument Approaches (2.5%)	2,063	2,090	2,233	2,380	2,672

Source: Virginia Air Transportation System Plan Update (VATSP) - 2003
FAA Long-Range Aerospace Forecasts FY 2020, 2025, 2030
Delta Airport Consultants, Inc. Analysis

F. FORECAST SUMMARY

Local economic strength and socioeconomic growth potential are key indicators of future demand for general aviation activity. The population of Chesterfield County continues to grow at a rate higher than the Commonwealth of Virginia. Employment and personal income have also remained above the state and are anticipated to maintain moderate growth trends throughout the 20-year planning period. These trends represent positive indicators for continued increase in demand for general aviation services at the Chesterfield County Airport.



The FBO at FCI serves a wide range of general aviation clients ranging from helicopters and Cessna 150 type aircraft to the Gulfstream G-V. **Table 3-15** presents a summary of the forecasts for Chesterfield Airport over the 20-year planning period. These forecasts indicate that all aspects of aviation demand at the airport will continue to grow during the planning period. Therefore, ongoing development of facilities will enable the airport to continue to accommodate the growth in aviation demand and contribute to the economic vitality of the service area.



Table 3-15
Chesterfield County Airport
Forecast Summary

FORECAST ELEMENT	BASE		FORECAST YEARS			AVERAGE ANNUAL COMPOUND GROWTH RATES			
	2007	2008	2013	2018	2027	2008 ³	2013	2018	2027
Total Based Aircraft¹	130	130	137	143	155	0.0%	1.1%	0.9%	0.9%
Single Engine Piston	97	91	96	100	108	-6.2%	1.1%	0.8%	0.9%
Multi-Engine Piston	18	18	18	18	18	0.0%	0.0%	0.0%	0.0%
Multi-Engine Turbo-Prop	3	5	5	5	5	66.7%	0.0%	0.0%	0.0%
TurboJet	7	10	12	14	18	42.9%	3.7%	3.1%	2.8%
Rotorcraft	4	5	5	5	5	25.0%	0.0%	0.0%	0.0%
Other	1	1	1	1	1	0.0%	0.0%	0.0%	0.0%
Operations	82,500	83,597	89,306	95,218	106,860	1.3%	1.3%	1.3%	1.3%
Local ⁴	33,000	33,439	35,722	38,087	42,744	1.3%	1.3%	1.3%	1.3%
Itinerant	49,500	50,158	53,584	57,131	64,116	1.3%	1.3%	1.3%	1.3%
Operations by Aircraft Type (GA & Air Taxi)	82,250	83,347	89,056	94,969	106,610	1.3%	1.3%	1.3%	1.3%
Single Engine Piston	55,930	56,676	60,558	63,628	71,429	1.3%	1.3%	1.0%	1.3%
Multi-Engine Piston	7,402	7,501	8,015	8,547	9,595	1.3%	1.3%	1.3%	1.3%
Multi-Engine Turbo-Prop	5,758	5,834	6,234	6,648	7,463	1.3%	1.3%	1.3%	1.3%
TurboJet	9,870	10,002	10,687	12,346	13,859	1.3%	1.3%	2.9%	1.3%
Rotorcraft	3,290	3,334	3,562	3,800	4,264	1.3%	1.3%	1.3%	1.3%
Military Operations	250	250	250	250	250	0.0%	0.0%	0.0%	0.0%
Total Peak Hour Operations	38	38	41	44	49	0.0%	1.5%	1.4%	1.2%
Total Instrument Approaches	2,063	2,090	2,233	2,380	2,672	1.3%	1.3%	1.3%	1.3%
Total GA Pilots & Passengers	102,813	104,185	111,320	118,710	133,263	1.3%	1.3%	1.3%	1.3%

Note: ¹ Source for based aircraft data is airport records; growth rates 2013 and beyond are from VATSP.

² Source for operations base data is 5010-1 dated March 2007 with growth rates from VATSP.

³ Actual survey data from airport records and resulting growth rate, January 2009.

⁴ Based on average flight training hours provided by Dominion Aviation Services, February 2009.

Sources: FCI 2008 Based Aircraft Summary Report as reported to DOAV January 2009



A. INTRODUCTION

The purpose of this Chapter is to determine the ability of the Chesterfield County Airport (FCI) to accommodate the anticipated increase in aviation demand presented in Chapter Three and identify the facilities that are needed to meet this demand during the 20-year planning period. With the exception of military operations, all segments of aviation activity are forecast to experience a moderate increase in operations; therefore, in order to accommodate this growth, a host of airfield improvements and/or facility development are necessary.

The methodology used to determine facility requirements begins with an examination of the airport's major components including its airspace, airfield, buildings, and surface access. It is important to note that these system components serve as the foundation for the airport's capacity and efficiency, and any deficiencies in the design or implementation of the components may create unnecessary congestion or delay in the air transportation system. Any deficiencies in the airport's facilities are identified based upon standards presented in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13, *Airport Design*, through change number 14.

B. CRITERIA FOR PLANNING

From a planning perspective, airports and associated runways and taxiways are evaluated for the most demanding airplane (critical aircraft) currently using or projected to use the facility on a regular basis. Under site specific conditions, the weight, wingspan, and performance characteristics of these aircraft ultimately determine the airport's geometry in terms of runway/taxiway configurations, lengths, and separations. The types of approach aids, lighting, and navigational equipment required at an airport are determined primarily by the level of annual activity, weather, terrain characteristics, and role of the airport in the national system of airports. The planning criteria described above are applied with the forecast demand presented in Chapter Three to produce the resulting facility requirements.



1. Fundamental Airfield Development

FAA Order 5090.3C, "Field Formulation of the NPIAS", provides guidelines for fundamental airfield development. Fundamental development is considered to be the basic configuration recommended for an airport in the national system and is affected by the type of activity the airport serves. It includes, but is not limited to, land acquisition, aircraft movement areas, landing and navigation aids, and aircraft parking areas.

As FCI is a well developed facility, many of the fundamental elements have already been established. However, as FCI continues to grow it is important to consider the expansion or addition of fundamental development to support current and future demand. FAA Order 150/5300-13, Airport Design, contains the standards and recommendations required by FAA funded airports. Development determined to be necessary based upon the analysis contained in this chapter will follow these standards. Fundamental development should be recommended in accordance with the standards and criteria contained in all appropriate Advisory Circulars and Orders.

2. Existing and Future Role of the Airport

Turbojet operations comprise approximately 10,000 of the forecasted annual operations for 2008 with growth to approximately 14,000 forecast for 2027. As mentioned in Chapter One, the critical family of aircraft for FCI during the current planning period (2008-2027) is the medium size business jet, similar to the Challenger 604 and Hawker 800 type aircraft. Both of these specific aircraft types are based at FCI and Dominion Aviation Services has recently acquired a Gulfstream G-200 to support their west coast charter operations. An analysis of other business jet aircraft in the FCI operational fleet revealed that more than 50 percent of the total business jet operations involve aircraft with Group II or greater wingspan characteristics.

FCI is designated a general aviation reliever airport for Richmond International Airport, with an airport reference code (ARC) of C-II, justified by the critical aircraft represented



by the family of medium size business jets as detailed in **Table 4-1**. Operational activity is forecasted to increase during the planning period; however, the overall role of the airport will remain as general aviation. It is recommended that the airport remain classified as ARC C-II capable of accommodating:

- Approach Category C Aircraft - Approach speeds of 121 knots up to, but not including 141 knots.
- Design Group II Aircraft - Wingspans of 49 feet up to, but not including 79 feet.

Table 4-1
Chesterfield County Airport
Critical Aircraft Summary

	Approach Speed	Wingspan*	Maximum Take-off Weight (lbs)
Previous Planning Period (1992-2012)			
Gulfstream III	136	78	69,700
Current Planning Period (2008-2027)			
Challenger 604	125	54	47,600
Hawker 800	127	52	28,000
Gulfstream 200	133	58	35,450

*rounded to nearest foot

Sources: Delta Airport Consultants Inc.

Aircraft Characteristics, 9th Edition, Burns & McDonnell

Over the 20-year planning period, the airport will continue to accommodate the general aviation fleet of piston, turboprop, and business jet aircraft.

3. Existing Non-Standard Conditions

The existing separation between Runway 15-33 and Taxiway 'A' is the primary non-standard condition at FCI. The current separation from the runway centerline to the taxiway centerline is 375 feet. FAA AC 150/5300-13 states that standard separation for an ARC C-II facility is 400 feet; however, the FAA approved a Modification of Airport Design Standards (MOS) on November 27, 2006 for the non-standard separation between Runway 15-33 and the parallel taxiway. The FAA determined that the separation is adequate as long as the critical aircraft is no larger than the G-IV. **Since the critical aircraft for FCI is anticipated to be no larger than the G-IV throughout the**



planning period, it is recommended that the parallel taxiway remain in its current location. A discussion of challenges required to meet design standard separation will be presented in Chapter Six, Alternatives.

Additional non-standard conditions include the width of Taxiways 'A', 'B', 'C', 'D' and 'E', existing penetrations to Part 77 surfaces, and a portion of RPZ land not within direct control of the County. **It is recommended that the County clear existing obstructions and gain control of land within the RPZs via fee simple interest or via easement if fee acquisition is not practicable. It is also recommended that the taxiway widths be reduced at the time of scheduled rehabilitation.**

C. AIRFIELD AND AIRSPACE CAPACITY

The ability of an airport to accommodate aviation activity is a function of the number of runways, the runway and taxiway configuration, and the mix of aircraft using the airport. The capacity of any runway is finite with respect to the number of hourly and annual operations it may ultimately accommodate. Moreover, capacity is expressed by two principle terms: annual service volume and hourly capacities under Visual Flight Rules (VFR) and Instrument Flight Rules (IFR).

These variables are used to provide a quantitative breakdown of the airport's annual service volume (ASV) and hourly capabilities (VFR and IFR). The procedures used for this analysis are detailed in FAA AC 150/5060-5, *Airport Capacity and Delay* and FAA Airport Design Program, Version 4.2D.

1. Runway Capacity

Runway capacity is defined as a measure of the maximum number of aircraft operations which can be accommodated at that airport on an hourly and/or annual basis without compromising the safety of aircraft operations. This estimate accounts for differences in runway use, aircraft mix, and weather that may be encountered over the span of a typical



year. A runway's ability to accommodate aircraft is largely determined by an aircraft's speed and weight. General aviation aircraft (lighter aircraft) typically have lower approach-to-landing speeds than commercial aircraft (passenger jets) which equates to a lower runway occupancy time. Conversely, larger and heavier aircraft typically operate at higher approach-to-landing speeds which require more deceleration time. This increased deceleration time results in a longer runway occupancy time which decreases runway capacity.

Another distinction between lighter and heavier aircraft that affects runway capacity is wake turbulence. This phenomenon results from aircraft operations, both on the ground and in the air and includes vortices, thrust stream turbulence, jet blast and propeller wash. Wake turbulence generated from another aircraft can greatly affect the safe operation of a subsequent aircraft requiring increased aircraft separation distances on the ground and in the air. Heavier aircraft generate more wake turbulence than lighter aircraft. Depending on the types of aircraft following each other during approach-to-landing operations, a typical separation distance of four to six miles is required. Appropriate time or distance intervals are also required for aircraft departing a runway. Similar to aircraft approach-to-landing speeds discussed earlier, heavy aircraft departures decrease a runway's capacity as opposed to lighter type aircraft.

In order to measure an airport's runway capacity, the FAA developed an aircraft wake turbulence classification system based upon a particular aircraft's weight and number of engines. **Table 4-2** presents the FAA Aircraft Classification System used in determining aircraft mix. The wake turbulence alphabetical classification is different from the aircraft approach speed alphabetical classification system associated with the airport reference code system. A representative sample of aircraft operating at FCI and their respective wake turbulence classifications are presented in **Table 4-3**.



Table 4-2
Chesterfield County Airport
Aircraft Wake Turbulence Classification

Aircraft Classification	Description¹
Class A	Small single-engine aircraft weighing 12,500 pounds or less
Class B	Small twin-engine aircraft weighing 12,500 pounds or less
Class C	Large aircraft weighing more that 12,500 pounds, but less than 300,000 pounds
Class D	Heavy aircraft weighing more than 300,000 pounds

Note: ¹Weights refer to maximum certificated take-off weight.
Source: FAA AC 150/5060-5 *Airport Capacity and Delay*, 1983

Table 4-3
Chesterfield County Airport
Representative Aircraft

Aircraft	Wake Turbulence Classification	Weight (lbs.) MGTW¹
Cessna 150	A	1,600
Cessna 172	A	2,658
Beech Bonanza F33A	A	3,400
Piper Navajo	B	6,200
Beech Baron 58P	B	6,200
Cessna Conquest 441	B	9,925
Cessna Citation I	B	11,850
Beech King Air B200	B	12,500
Citation V	C	15,900
Raytheon Beechjet	C	16,100
Gates Learjet 35	C	18,300
Cessna 650 Citation	C	21,000
HS-125 Series 700	C	24,200
Hawker 800	C	28,000
Dassault Falcon 20	C	28,660
G-200	C	35,450
G-250	C	39,600
Bombardier CL-600	C	41,250
Challenger 604	C	47,600
Grumman G-II	C	65,500
Grumman G-III	C	69,700
G-350	C	70,900
Grumman G-IV	C	74,600
G-450	C	73,900

Note: ¹MGTW = Maximum Gross Take-off Weight
Sources: FAA 150/5300-13 "Airport Design," Change 14.
FAA 150/5060-5 "Airport Capacity and Delay, 1983"



The operational fleet mix for FCI was developed from airport records and the aviation forecasts presented in Chapter Three. **Table 4-4** presents the operational fleet mix for the existing conditions in 2008 and the projected fleet mix for the end of the planning period in 2027.

Table 4-4
Chesterfield County Airport
Aircraft Fleet Mix

Aircraft Class	Description	2008		2027	
		Operations	Percent	Operations	Percent
A	Single-engine <12,500 lbs ¹	60,010	72	75,693	71
B	Twin-engine <12,500 lbs	13,535	16	17,335	16
C	Aircraft >12,500 lbs, but <300,000 lbs	10,052	12	13,832	13
D	Aircraft >300,000 lbs	0	0	0	0
Total		83,597	100	106,860	100

Note: ¹ Includes single-engine, experimental, rotorcraft, and other aircraft types.

Sources: FAA AC 150/5060-5 *Airport Capacity and Delay*, 1983
Delta Airport Consultants, Inc. Analysis

While operations are forecast to increase, the overall mix of aircraft at FCI is expected to remain consistent with base year activity.

a. Existing Runway Capacity Analysis

Both VFR and IFR hourly runway capacities and the annual service volume (ASV) were calculated for the existing single runway system configuration at FCI. The following discussion adheres to the guidelines contained in the FAA AC 150/5060-5 *Airport Capacity and Delay* and the FAA *Airport Design* computer program version 4.2D. These resources support development of a reasonable estimate of the airport's hourly and annual runway capacity. The estimates are then compared to the approved forecast to determine if the capacity of the runway is sufficient.

Both hourly and annual runway capacities were calculated using the FAA *Airport Design* Program, Version 4.2D. The existing and future capacities were predicated on the current runway configuration and operating characteristics. **Table 4-5** presents a comparison of



existing demand versus existing capacity. As indicated, FCI is currently operating at 37 percent of its total annual service volume.

Table 4-5
Chesterfield County Airport
Existing (2008) Demand versus Existing Capacity

Total Operations¹	Annual Service Volume	Total Operating Capacity
84,000	230,000	37%

Note: ¹Total Operations (83,597) rounded for calculations.

Sources: FAA Design Program Version 4.2ID

Delta Airport Consultants, Inc. Analysis.

b. Future Runway Capacity Analysis

The future runway capacity was calculated using the same procedure as previously described. As presented in **Table 4-6**, forecasted demand versus future runway capacity is expected to increase to 47 percent of the annual service volume (ASV) during the planning period.

Table 4-6
Chesterfield County Airport
Future (2027) Demand versus Existing Capacity

Total Operations¹	Annual Service Volume	Total Operating Capacity
107,000	230,000	47%

Note: ¹Total Operations rounded for calculations (106,860).

Sources: FAA Design Program Version 4.2ID

Delta Airport Consultants, Inc.

Industry and FAA guidelines recommend that runway capacity improvements be considered when actual operations reach 60 percent of the theoretical ASV. **When annual aircraft operations reach 138,000 at FCI, a more detailed analysis should be performed to more accurately assess runway capacity and the need for a parallel or crosswind runway. This level of operations is not anticipated during the current 20-year planning period, thus any consideration of crosswind or parallel runway development is considered conceptual and would be depicted as “ultimate” development on the ALP.**



2. Taxiway Capacity

The location of the exit taxiways can also affect the overall capacity of an airport and contribute to the efficiency of aircraft circulation. Exit taxiway locations depend a great deal on the mix of aircraft, approach and touchdown speeds, point of touchdown, exit speed, rate of deceleration, condition of the pavement surface (i.e., wet or dry) and the number of exits. General design practices recommend placing exit taxiways at intervals of 1,500 feet to 2,000 feet for airports that handle a wide variety of aircraft.

FAA AC 150/5300-13, Airport Design, states that when design peak hour traffic is less than 30 operations, properly located right-angled exit taxiways achieve an efficient flow of traffic. The FAA AC also recommends bypass taxiways be considered to provide flexibility in runway use and notes that holding bays should be provided when runway operations reach a level of 30 per hour. **Both runway ends currently have holding bays which meet the need of the planning period.**

3. Airspace Capacity

As detailed in Chapter Two, Class E airspace surrounds FCI. This airspace is a controlled area which includes airspace corridors identified as federal airways, or which accommodate jet traffic at low altitudes. **No airspace capacity deficiencies were identified during this study.**

D. AIRSIDE FACILITY REQUIREMENTS

The airport facility requirements are based upon FAA AC 150/5300-13, Airport Design, Change 14 as it relates to the current and future critical aircraft. As discussed previously, the critical aircraft determines the airport reference code from which the airside geometrics are evaluated.



1. Runway Analysis

This section evaluates the runway length, width, safety areas, and object free areas based on the existing and future aircraft expected to use this facility. The recommendations are based on FAA advisory circulars, specific manufacturers' aircraft performance data, and runway use limitations placed on fractional owner operations such as Federal Aviation Regulation (FAR) Part 91K.

a. Runway Length and Width

The determination of runway length required for an airport is based on standards presented in FAA AC 150/5300-13, Chapter 3 and FAA AC 150/5325-4A, Runway Length Requirements for Airport Design. The recommended length for a primary runway at an airport is determined by considering either the family of airplanes having similar performance characteristics or a specific aircraft requiring the longest runway. This need is based on the aircraft or family of aircraft that use the airport on a regular basis, where regular basis is typically defined as a minimum 500 itinerant operations per year. Additional factors considered include critical aircraft approach speed, its maximum certificated take-off weight, useful load and length of haul, the airport's field elevation above sea level, the mean daily maximum temperature at the airfield, and typical runway surface conditions, such as wet and slippery.

The initial analysis of recommended runway length for FCI is based on performance curves developed from FAA approved airplane flight manuals in accordance with Federal Aviation Regulations. Guidance on runway length analysis is provided in Advisory Circular AC 150/5325-4B, Runway Length Requirements for Airport Design. Tables 3-1 and 3-2 of the AC (see **Exhibits 4-1 and 4-2**) provide a listing of aircraft identified by the FAA to comprise 75 percent and 100 percent of the national fleet of corporate jets respectively. **Given the based and transient jets operating at FCI, as highlighted in the tables, the 100 percent table should be used for determining runway length requirements.**



Table 3-1. Airplanes that Make Up 75 Percent of the Fleet

Manufacturer	Model	Manufacturer	Model
Aerospatiale	Sn-601 Corvette	Dassault	Falcon 10
Bac	125-700	Dassault	Falcon 20
Beech Jet	400A	Dassault	Falcon 50/50 EX
Beech Jet	Premier I	Dassault	Falcon 900/900B
Beech Jet	2000 Starship	Israel Aircraft Industries (IAI)	Jet Commander 1121
Bombardier	Challenger 300	IAI	Westwind 1123/1124
Cessna	500 Citation/501 Citation Sp	Learjet	20 Series
Cessna	Citation I/II/III	Learjet	31/31A/31A ER
Cessna	525A Citation II (CJ-2)	Learjet	35/35A/36/36A
Cessna	550 Citation Bravo	Learjet	40/45
Cessna	550 Citation II	Mitsubishi	Mu-300 Diamond
Cessna	551 Citation II/Special	Raytheon	390 Premier
Cessna	552 Citation	Raytheon Hawker	400/400 XP
Cessna	560 Citation Encore	Raytheon Hawker	600
Cessna	560/560 XL Citation Excel	Sabreliner	40/60
Cessna	560 Citation V Ultra	Sabreliner	75A
Cessna	650 Citation VII	Sabreliner	80
Cessna	680 Citation Sovereign	Sabreliner	T-39

SOURCE:

ADVISORY CIRCULAR (AC 150/5325-4B TABLE 3-1, DATED 07-01-2005) PROVIDED BY FAA
(FEDERAL AVIATION ADMINISTRATION - WWW.FAA.GOV).



**75 PERCENT FLEET
CHESTERFIELD COUNTY AIRPORT**

**EXHIBIT
4-1**

Table 3-2. Remaining 25 Percent of Airplanes that Make Up 100 Percent of Fleet

Manufacturer	Model
Bac	Corporate 800/1000
Bombardier	600 Challenger
Bombardier	601/601-3A/3ER Challenger
Bombardier	604 Challenger
Bombardier	BD-100 Continental
Cessna	S550 Citation S/II
Cessna	650 Citation III/IV
Cessna	750 Citation X
Dassault	Falcon 900C/900EX
Dassault	Falcon 2000/2000EX
Israel Aircraft Industries (IAI)	Astra 1125
IAI	Galaxy 1126
Learjet	45 XR
Learjet	55/55B/55C
Learjet	60
Raytheon/Hawker	Horizon
Raytheon/Hawker	800/800 XP
Raytheon/Hawker	1000
Sabreliner	65/75

NOTE: AIRPLANES IN TABLES 3-1 AND 3-2 COMBINE TO COMPRISE 100% OF THE FLEET.

SOURCE:

ADVISORY CIRCULAR (AC 150/5325-4B TABLE 3-2, DATED 07-01-2005) PROVIDED BY FAA (FEDERAL AVIATION ADMINISTRATION - WWW.FAA.GOV).



**100 PERCENT FLEET (TOP 25%)
CHESTERFIELD COUNTY AIRPORT**

**EXHIBIT
4-2**

DRAWN BY: LKH CHECKED BY: RGL SCALE: NONE DATE: OCTOBER 2010

Having defined 100 percent of the fleet as appropriate for FCI analysis, the useful load factor of these aircraft is also considered. The mean daily maximum temperature (87F degrees) and the airfield elevation (237 MSL) are used in **Exhibit 4-3** to determine a runway length requirement of approximately 5,350 feet for the 60 percent useful load and approximately 8,150 feet for the 90 percent useful load. **Table 4-7** illustrates the take-off and landing runway distance required for select business jets, highlighting those requirements greater than FCI's existing runway length of 5,500 feet.

The data provided in Table 4-7 also highlights the runway landing distance requirements for fractional and air taxi charters operating under FAR Part 91K and Part 135, respectively. Operational limitations for Part 135 arrivals include the ability to land within 60 percent of the available runway. A runway length shorter than that noted in the fractional/air taxi column would limit the useful load of the inbound aircraft.

Table 4-7
Chesterfield County Airport
Runway Length Requirements

Aircraft Type	Take-off Distance Required		Landing Distance Required			
	Dry	Wet	Dry		Wet	
			Distance	Fractional/ Air Taxi	Distance	Fractional/ Air Taxi
Citation (560)						
Encore	4,300	5,258	3,308	5,514	4,987	6,341
Citation (561XL)						
Excel	4,593	4,593	3,652	6,086	5,797	7,000
Citation (680)						
Sovereign	4,303	5,015	3,164	5,274	4,096	6,065
Citation (750) X	6,772	7,555	3,787	6,312	5,377	7,259
Hawker 800XP	6,135	6,135	2,667	4,445	2,667	4,445
Challenger	6,217	6,217	2,776	4,676	2,776	4,676
Falcon 2000	6,975	6,975	3,139	5,232	3,610	6,017
Gulfstream 200	6,991	7,506	3,420	5,472	3,975	6,355
G-III	6,320	6,320	4,347	7,245	4,347	7,245
G-IV - SP	6,667	8,040	3,192	5,320	3,671	6,118

Note: indicates requirement greater than existing runway length (5,500')

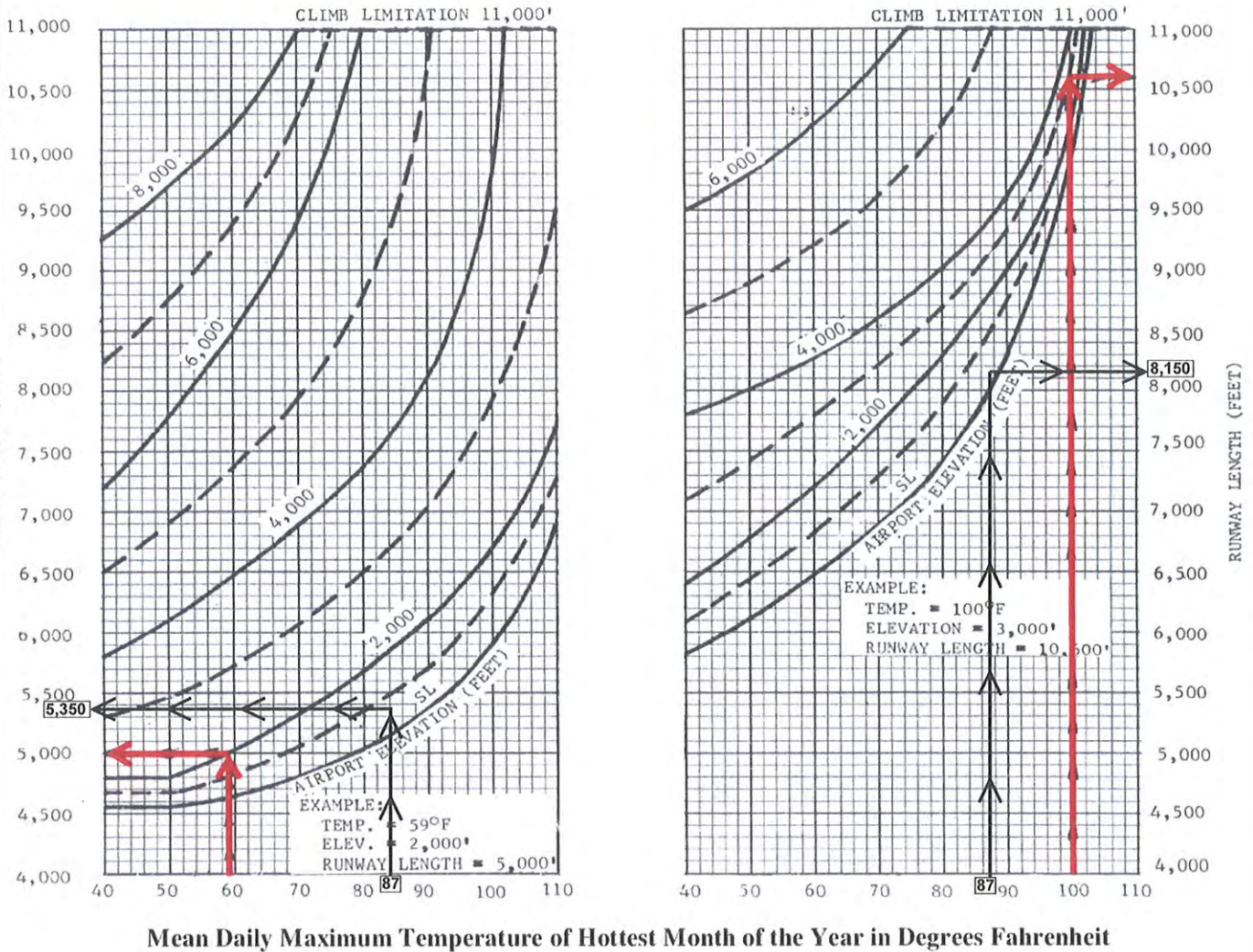
Assumes: 30 degrees C, 237 MSL, Max take-off and landing weight

Source: Operator supplied data

Delta Airport Consultants analysis (Aerospace Source book, FAA runway length calculation)



Figure 3-2. 100 Percent of Fleet at 60 or 90 Percent Useful Load



100 percent of feet at 60 percent useful load

100 percent of feet at 90 percent useful load

LEGEND

←←← FCI SPECIFIC CALCULATION
 ←←← FAA SAMPLE CALCULATION

SOURCE:

ADVISORY CIRCULAR (AC 150/5325-4B FIGURE 3-2, DATED 07-01-2005) PROVIDED BY FAA (FEDERAL AVIATION ADMINISTRATION - WWW.FAA.GOV).



**RUNWAY LENGTH REQUIRED (100% FLEET)
 CHESTERFIELD COUNTY AIRPORT**

**EXHIBIT
 4-3**

DRAWN BY: LKH CHECKED BY: RGL SCALE: NONE DATE: OCTOBER 2010

The runway length analysis for FCI was also performed using FAA Airport Design Computer Program 4.2D and procedures outlined in FAA AC 150/5300-13. The program includes an aircraft fleet profile designed to be representative of the small and large aircraft that comprise the general aviation aircraft fleet in the United States. For FCI, the program produced a recommended runway length of 5,800 feet to accommodate 100 percent of large aircraft at 60 percent useful load and a length of 8,660 feet to accommodate the 100 percent fleet at 90 percent useful load (see **Table 4-8**).

Table 4-8
Chesterfield County Airport
FAA Airport Design Runway Length Requirements

AIRPORT RUNWAY DATA	
Airport Elevation (MSL)	237'
Mean daily temperature of the hottest month	88.8 F
Maximum difference in runway centerline elevation	37'
Length of haul for airplanes of more than 60,000 pounds	1,000 miles
Runway Length Recommended for Airport Design	
Small airplanes with approach speeds of less than 30 knots	310'
Small airplanes with approach speeds of less than 50 knots	820'
Small airplanes with less than 10 passenger seats	
75 percent of these small airplanes	2,570'
95 percent of these small airplanes	3,120'
100 percent of these small airplanes	3,710'
Small airplanes with 10 or more passenger seats	4,280'
Large airplanes of 60,000 pounds or less	
75 percent of these large airplanes at 60 percent useful load	5,380'
75 percent of these large airplanes at 90 percent useful load	7,010'
100 percent of these large airplanes at 60 percent useful load	5,800'
100 percent of these large airplanes at 90 percent useful load	8,660'
Airplanes of more than 60,000 pounds	6,050'

Source: FAA Airport Design Computer Program 4.2D.



For purposes of this analysis, the term *useful load* refers to the difference between the maximum allowable structural gross weight and the operating empty weight of the aircraft in question. FAA guidelines require the selection of 60 percent or 90 percent useful load to be based on the length of haul and service needs of the family of critical design aircraft, and notes that the 60 percent useful load table is to be used for those airplanes operating with no more than a 60 percent useful load factor. Operators of based and transient corporate jets at FCI have documented their need to operate their aircraft at useful loads greater than 60 percent, and frequently approaching the maximum practical payload of 90 percent (see correspondence in **Appendix C**).

In reviewing the runway length requirements produced from the FAA performance charts and computer program, **the existing useable primary runway length of 5,500 feet was found to be inadequate to accommodate the large airplane fleet operating at FCI (both current and future) as the useful load approaches 90 percent.** Operational data for based and transient aircraft indicate however that the upper limit of runway requirement provided by FAA guidance exceeds actual need. Therefore, the recommended runway length was developed from the detail provided by actual based operators.

As of May 2009, FCI had 10 based turbojets: a Hawker 800XP, a Challenger, a Beech Premier, a British Aerospace BAe 125 (currently marketed as a Hawker 800), and six Cessna Citations. Two additional based jets arrived during 2009; a Gulfstream G200 was acquired by Dominion Aviation Services to support their FAA Part 135 operations to the West Coast and a Gulfstream G100 was acquired by Imaginary Images, Inc. The number of based business jets is forecast to grow to 18 by 2027. During the same period, the number of annual turbojet operations is forecast to increase by more than 40%; from 9,870 to 13,859. **Table 4-9** illustrates the estimated turbojet operations by aircraft type.



Table 4-9
Chesterfield County Airport
Estimated Turbojet Operations

Aircraft Type	Estimated Annual Operations	
	2008	2027
Medium Business Jets	5,725	8,039
- Citation		
- Beech Jet		
- Learjets		
Small Business Jets	2,845	4,020
- Hawker 800		
- Challenger		
- Gulfstream		
Very Light Jets (VLJ)	1,300	1,800
TOTAL	9,870	13,859

Source: FlightAware data analysis applied to operational forecast as presented in Chapter 3.

In addition to the findings from the FAA's runway length determination guidance, operational details from based and transient jet operators were solicited to confirm their operational needs.

- Massey Energy Company, the fourth largest coal company in the United States and a key employer to the greater Richmond area, bases a Challenger 601 at FCI and documented the need for 6,217 feet of runway (detail provided in **Appendix C**) as the current length does not fully support their operational needs.
- Dominion Aviation Services, which provides FBO, jet charter and aircraft management services at FCI, operates a Hawker 800XP and expressed that during inclement weather conditions the current runway length is inadequate to support their operational needs. The most critical operational limitations experienced has been the reduction of useful load capability as low as 33 percent. This limitation has on occasion required the Hawker to be ferried to Richmond International Airport for fueling and passenger loading. As noted in Table 4-7, the Hawker required 6,135 feet of runway length.
- NetJets, a national leader in providing fractional jet services, noted that 35 percent of



its customers that use FCI are Hawker 800XP owners, but ten different aircraft are offered by NetJets for service to FCI. Six of the ten aircraft incur Part 135 operational limitations due to the current runway length. A runway length of 6,000 feet to 7,300 feet would be required to remove the landing limitations.

- Kids R Kids, a national education provider, frequently operates a Citation Excel at FCI and noted that the existing runway length is inadequate to support their operations year round and specifically during wet and winter weather conditions.
- A review of performance data for other aircraft within the FAA defined national fleet of general aviation business jets documented need for greater than the existing runway length as useful loads approach 90 percent.

In addition to analysis of useful loads, stage length is also a key factor in determining runway length. A sampling of trips from FCI exceeding 1,000 nautical miles (NM) are highlighted in **Table 4-10** and include the destinations of San Jose, California; Calgary, Alberta; San Antonio, Texas; and Christiansted, U.S. Virgin Islands. **Exhibit 4-4** illustrates these destinations graphically.

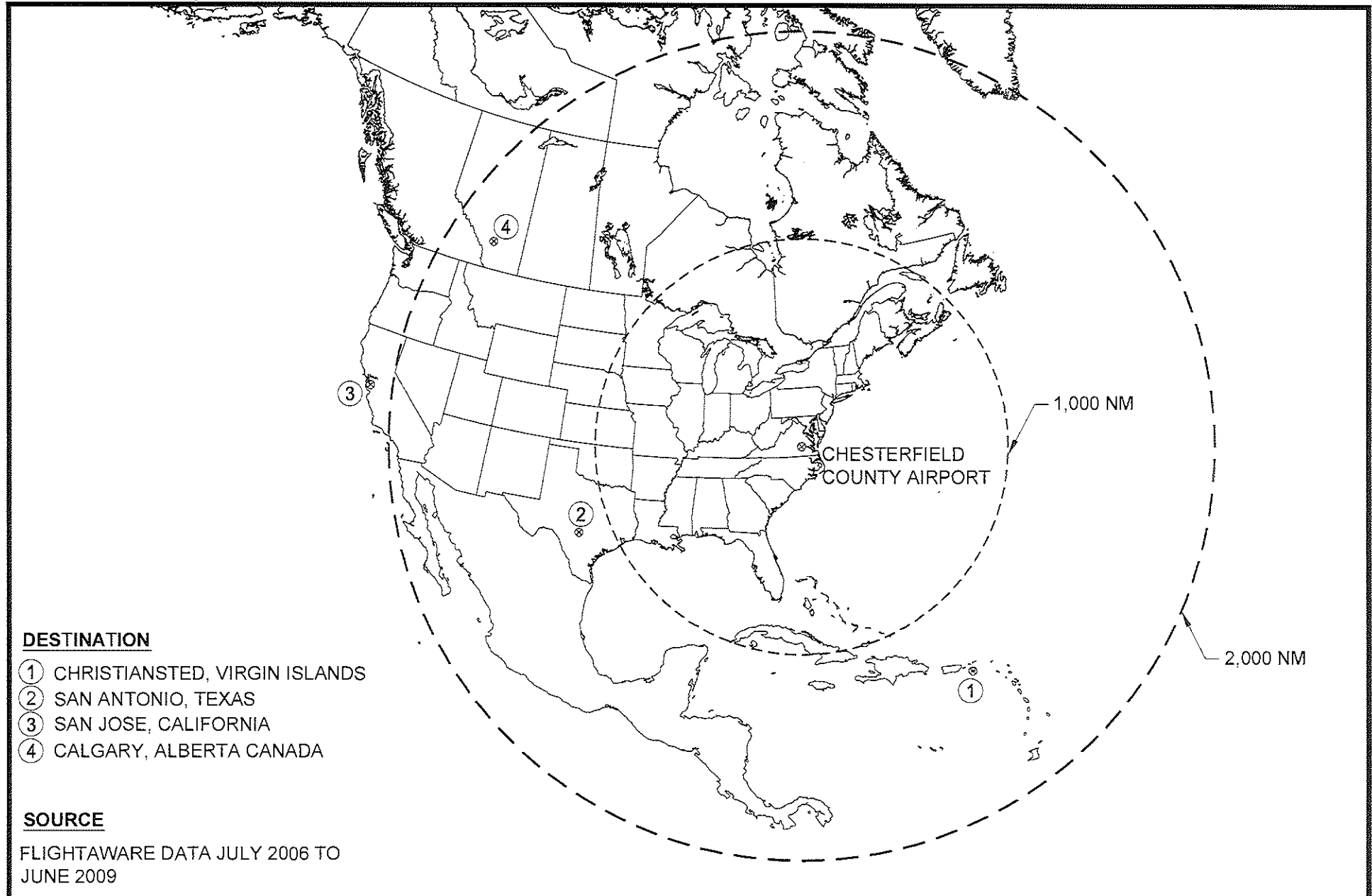
Table 4-10
Chesterfield County Airport
Stage Length Exceeding 1,000 NM

Owner	Aircraft Type	Destination	Approx. Distance (NM)
Bombardier Aerospace	Challenger 300	San Jose, California	2,100
Unknown	Citation Sovereign	Calgary, Alberta	1,750
Ramo, LLC	IAI 1124 Westwind	Christiansted, U.S. Virgin Islands	1,350
Unknown	IAI 1124 Westwind	Christiansted, U.S. Virgin Islands	1,350
Vincent Charters	Hawker 800	Christiansted, U.S. Virgin Islands	1,350
NetJets	Hawker 800, Citation 5, Citation Excel	San Antonio, Texas	1,150

Source: FlightAware Data, July 2006-2009.

Note: Digital files of FlightAware data used in this analysis are on file with the FAA, DOAV, and Chesterfield County.





STAGE LENGTH EXCEEDING 1000 NM CHESTERFIELD COUNTY AIRPORT

EXHIBIT
4-4

DRAWN BY:

LKH

CHECKED BY:

KSK

SCALE:

1" = 4,000,000'

DATE:

OCTOBER 2010

As noted in Chapter One, FCI is a designated reliever airport for Richmond International Airport (RIC). FCI's designation as a reliever also is a factor in determining runway length. Analysis was conducted for other facilities similar to FCI to determine typical runway lengths for reliever airports. **Table 4-11** illustrates those relievers with runways greater in length than FCI.

Table 4-11
Chesterfield County Airport
Designated Reliever Airports in Maryland, North Carolina, and Virginia

Commercial Service Airport ID	State	Reliever Airport	Primary Runway Length ¹	Based Jets
CLT	NC	Concord Regional (JQF)	7,400'	26
BWI	MD	Martin State (MTN)	6,996'	15
RDU	NC	Sanford-Lee County Regional (TTA)	6,500'	1
IAD	VA	Manassas Reg./Harry P Davis (HEF)	5,700'	27
CLT	NC	Monroe (EQY) ²	5,500'	3
IAD	VA	Leesburg Executive (IYO)	5,500'	2
RIC	VA	Chesterfield County Airport (FCI)	5,500'	10
BWI, DCA, IAD	MD	Frederick Municipal (FDK)	5,220'	7
BWI	MD	Carroll County (DMW) ³	5,100'	2
IAD	VA	Warrenton-Fauquier (HWY)	5,000'	0
DCA, IAD	VA	Stafford Regional (RMN)	5,000'	0
DCA	MD	Montgomery Co Airpark (GAI)	4,202'	3
ORF	VA	Hampton Roads Executive (PVG)	4,056'	1
DCA	MD	Maryland (2W5)	3,000'	0
BWI	MD	Tipton (FME)	3,000'	0
DCA	MD	Washington Executive/Hyde Field (W32)	3,000'	0

Notes: ¹Longest useable runway length

²Runway extension to 7,000' currently under construction.

³Runway extension to 6,400' programmed for construction.

Source: Appendix A of the *National Plan of Integrated Airport Systems (2009-2013)*

Operational detail, performance charts, and correspondence from operators are provided in **Appendix C**. **Based on this analysis, it is recommended that a runway length of 6,300 feet be considered as the critical length requirement and be used as the basis for primary runway planning at FCI during Phase II of the planning period. Additionally, it is recommended that an extension to 7,000 feet of runway length be considered for ultimate development. Table 4-12 details the payload and range increase with the recommended 6,300 foot runway.**



Table 4-12
Chesterfield County Airport
Estimated Payload/Range Increase with 6,300' Runway

Aircraft Type	Payload Increase (lbs)	Range Increase (NM)
Citation (560) Encore	0	0
Citation (561XL) Excel	0	0
Citation (680) Sovereign	0	0
Citation (750) X	1,800	450
Hawker 800XP	1,600	575
Challenger	1,600	600
Falcon 2000	1,200	450
Gulfstream 200	1,500	375
G-III	3,000	650
G-IV - SP	4,800	7000

Source: Delta Airport Consultant Analysis.

Runway 15-33 is 100 feet wide which is adequate to serve the airport's family of critical aircraft throughout the planning period.

In summary, this section has demonstrated the need to extend the single runway at FCI beyond the existing 5,500 feet consistent with FAA guidance. This need is supported by identification of the "family of medium size business jets" as the critical aircraft (represented by the Hawker 800 and Challenger aircraft as well as several other factors including:

- Service to the 100 percent fleet of U.S. business jets;
- Runway length determination for the 100 percent fleet; and
- Letters of support from both based and transient users.

Runway length determination for the 100% fleet for both 60% and 90% useful loads produced a requirement ranging from 5,350 feet to 8,660 feet, recognizing that the lower end of the range developed from the FAA tables (3-1 and 3-2 from the FAA runway length AC) does not account for wind, runway condition or effective runway gradient. Presentation, including letters of support, of both based and transient user concerns, revealed that their "service needs" would continue to not be met if restricted to operate at a 60% useful load. Since no interpolation between FAA guidance tables of 60% and 90%



useful load is allowed, the 90% load was used as the planning model to meet the operators' service needs. Based on operators' input, the 90% length requirements exceed the need. The County requested further input from the operators to determine an appropriate length to meet their needs; the responses typically ranged from 6,000 feet to 7,000 feet.

Additionally, there are significant intangible reasons for extending the runway length, including:

- To more fully meet the user service needs;
- Recognition of FCI's growing fleet of critical design airplanes (G-200 and G-100);
- Enhancement of overall operational safety;
- Increase to the airport's weather capability;
- That FCI is being considered as a Light Sport Aircraft (LSA) manufacturing site; and
- That on-site, on-call US Customs services are offered.

Given this input, it has been determined that a runway length of 6,300 feet is necessary for development during Phase I, and a length of 7,000 feet for ultimate development. Blast pads would also be constructed with the runway extension to mitigate erosion due to forecasted increase of jet traffic.

b. Runway Safety Areas (RSA)

A runway safety area is defined as a surface surrounding the runway which is suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot or excursion from the runway. FAA AC 150/5300-13, *Airport Design*, designates a minimum runway safety area based on the airport reference code of the runway. The existing RSA meets FAA standards; however, to remain in compliance, **it is recommended that the RSA be extended to 1,000 feet beyond the end of the runway in conjunction with the recommended extension project.** Table 4-13 details the



existing RSAs as well as the standards for existing and future conditions.

Table 4-13
Chesterfield County Airport
Runway Safety Areas

Runway	Existing		Future
	Actual	Standard	Standard/Proposed
15/33	500' x 7,500' *	500' x 7,500'	500 x 8,100' *

Note: *1,000 feet beyond each runway end.
Source: Delta Airport Consultants, Inc.

c. Runway Obstacle Free Zone

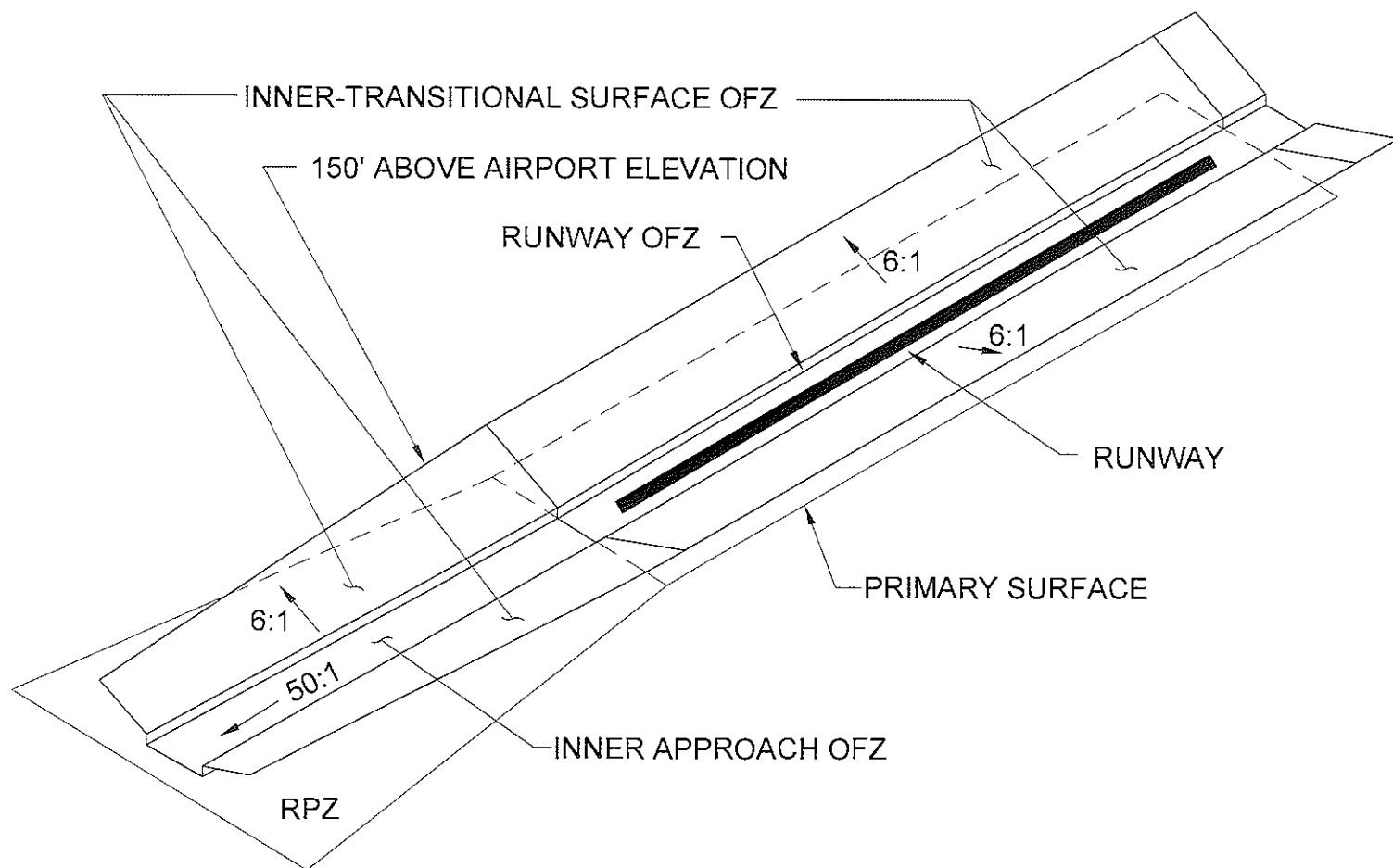
Exhibit 4-5, illustrates the runway obstacle free zone (OFZ) for FCI, which is the volume of airspace centered above the runway centerline and is required to be clear of all objects, except for frangible NAVAIDs. These NAVAIDs need to be located in the OFZ because of their function in order to provide clearance protection for aircraft landing or taking off from the runway, and for missed approaches, where applicable. The OFZ is subdivided as follows:

Runway OFZ - The airspace above the runway surface centered on the runway centerline. The elevation of the OFZ at any point is the same as the elevation of the nearest point on the runway centerline. The OFZ extends 200 feet beyond each runway end; however the width may vary depending on the runway classification.

- For Runway 15-33, the OFZ width is 400 feet.

Inner-Approach OFZ - The volume of airspace centered on the approach area, and applies only to runways with an approach lighting system (ALS). Consequently, this only applies to Runway 33 at FCI. The zone of airspace begins 200 feet from the runway threshold at the same elevation as the runway threshold and extends 200 feet beyond the last light unit in the ALS. Its width is the same as the runway OFZ and rises at a slope of 50 (horizontal) to 1 (vertical) from its beginning.





SOURCE: FAA ADVISORY CIRCULAR 150/5300 - 13



OBSTACLE FREE ZONE (OFZ) CHESTERFIELD COUNTY AIRPORT

EXHIBIT
4-5

DRAWN BY:

DVS/LKH

CHECKED BY:

KSK

SCALE:

NONE

DATE:

OCTOBER 2010

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- For Runway 33 the inner-approach OFZ is 400 feet wide and extends 200 feet beyond the outer most light of the existing MALSR.

Inner-Transitional OFZ – represents the volume of airspace along the sides of the runway OFZ and the inner-approach OFZ, and applies only to runways with approach visibility minimums lower than three-quarter statute miles. Consequently, this only applies to Runway 33 at FCI. **The Inner-Transitional OFZ is clear of obstacles.**

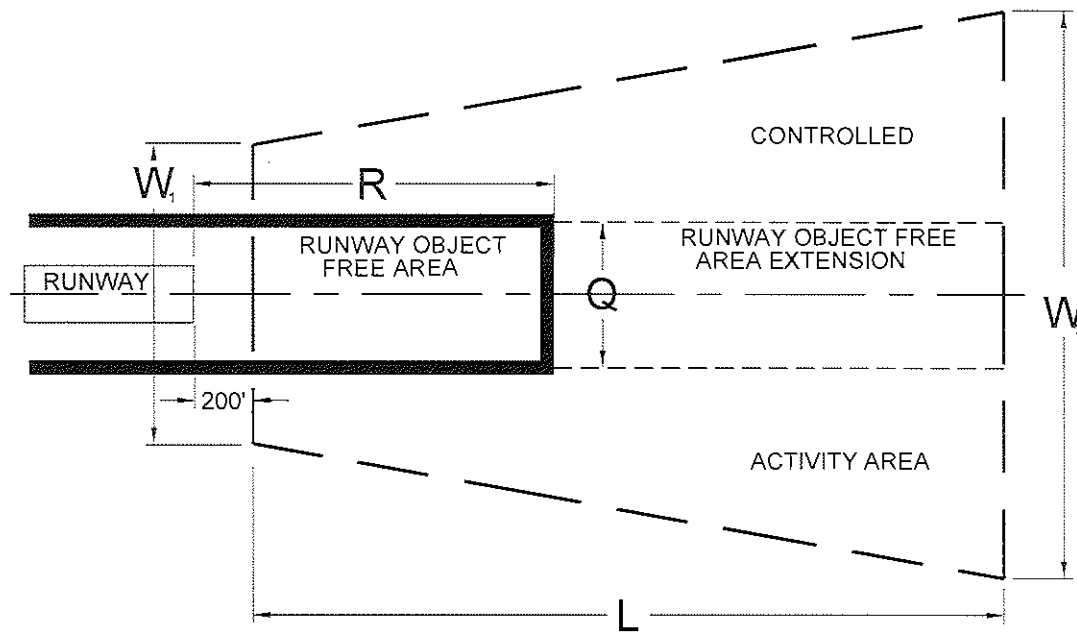
- For CAT I-ILS minimums, this airspace begins at the edges of the runway OFZ and inner-approach OFZ, then rises vertically to a height defined by the critical aircraft dimensions (Ref: FAA AC 150/5300-13), then slopes 6 (horizontal) to 1 (vertical) out to a height of 150 feet above the established airport elevation.

d. Runway Object Free Area

The runway object free area (ROFA) is a two dimensional surface centered on the runway centerline. It is provided to enhance the safety of aircraft operations by having the area free of objects except for those that need to be located within the ROFA for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the ROFA. The ROFA clearing standard requires clearing the OFA of above ground objects protruding above the runway safety area edge elevation. Object free areas are illustrated on **Exhibit 4-6.**

The existing ROFA meets FAA standards as it is 800 feet wide and 1,000 feet beyond the end of each runway. However, should Runway 15-33 be extended as recommended, **accommodation must be made for the extended ROFA. It is recommended that the necessary land be acquired to protect the extended ROFA. The land acquisition necessary for the extended ROFA is further discussed and illustrated within the Chapter Six, Alternatives.**





RUNWAY	VISIBILITY MINIMUMS	W_1	W_2	L	R	Q	
15	$\geq 3/4$ MILE	1,000 ft	1,510 ft	1,700 ft	1,000 ft	500 ft	W_1 = RUNWAY PROTECTION ZONE - INNER WIDTH
15	$< 3/4$ MILE	1,000 ft	1,510 ft	1,700 ft	1,000 ft	500 ft	W_2 = RUNWAY PROTECTION ZONE - OUTER WIDTH
33	$< 3/4$ MILE	1,000 ft	1,750 ft	2,500 ft	1,000 ft	500 ft	L = RUNWAY PROTECTION ZONE - LENGTH
							R = OBJECT FREE AREA - LENGTH BEYOND RWY END
							Q = OBJECT FREE AREA - WIDTH

SOURCE: FAA ADVISORY CIRCULAR 150/5300 - 13



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OBJECT FREE AREAS - RUNWAY PROTECTION ZONES (RPZ) CHESTERFIELD COUNTY AIRPORT

EXHIBIT
4-6

DRAWN BY:

LKH

CHECKED BY:

KSK

SCALE:

NONE

DATE:

OCTOBER 2010

e. Runway Protection Zones

Runway protection zones (RPZs) are trapezoidal in shape, centered on the extended runway centerline, and typically begin 200 feet beyond the end of the area usable for take-off and landing. The function of an RPZ is to enhance the protection of people and property on the ground, which is achieved through airport owner control over these land areas. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities.

Order 5090.3C indicates that an airport should control land as appropriate for airfield development, building area, runway protection zones, approach aids and compatible land use in accordance with current FAA criteria. The FAA prefers the airport owner control the defined Runway Protection Zone (RPZ) area in fee simple, to enhance protection of people and property on the ground. Runway protection zones and the associated dimensions are illustrated in Exhibit 4-6.

The airport does not currently own all the land within the existing RPZs. Currently, the majority of the Runway 15 RPZ is on airport property; the remainder is controlled by the airport via avigation easement. The existing Runway 33 RPZ is not entirely controlled by the airport as a portion of this area is over the intersection of Routes 288 and 10; however, the existing and proposed use of the property as Virginia Department of Transportation (VDOT) right-of-way does not present an incompatible land use. The recommended extension of Runway 15 and proposed establishment of an LPV approach for Runway 15, with lowered visibility minimums, will result in non-compatible land uses in the RPZ. The FAA has determined that an LPV with visibility not lower than $\frac{3}{4}$ mile is acceptable with the current runway length; however, should the runway be extended, an area north of Cogbill Road would present a land use concern. The County would be required to either control future land use or raise the LPV visibility minima to one mile. Should the County pursue visibility minima lower than $\frac{3}{4}$ mile for the Runway 15 LPV, a much larger RPZ area would require land use control to be obtained (see Exhibit 4-6). **It is recommended that the County acquire the appropriate property**



interest, either in fee simple or easement, within existing and future RPZs to prevent incompatible land uses.

f. Pavement Strength and Condition

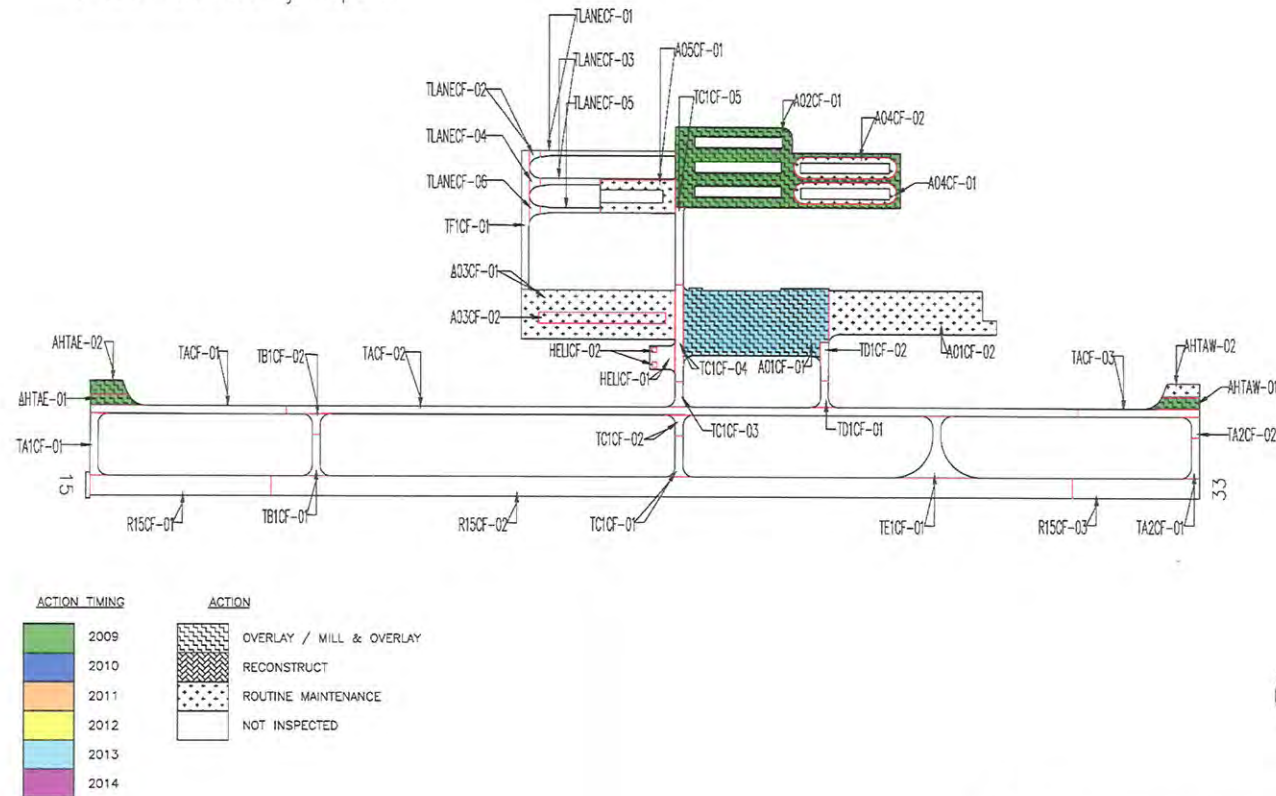
The airfield pavement at FCI is maintained in accordance with the established Pavement Maintenance Program that was developed as part of the Virginia Aviation System Plan published in 2008. Excerpts of the pavement conditional report are provided as **Appendix D** to this text and **Exhibit 4-7** details the recommended pavement rehabilitation for the period 2009-2013.

As noted previously, the critical aircraft for FCI is the family of medium size business jets with maximum gross take-off weight of less than 60,000 pounds. These medium size business jets are represented by the Hawker 800 and Challenger 604, which have max take-off weights of 28,000 pounds and 48,200 pounds, respectively.

Runway 15-33 is constructed of asphalt and is currently rated at 60,000 pounds single wheel and 80,000 pounds, dual wheel. The runway is in excellent condition due to a complete overlay and rehabilitation project in 2007. Although the project was not intended to increase the weight bearing capacity of the runway, the method of construction did have the effect of significantly increasing the runway strength. The project required major grade correction, which resulted in deep asphalt fills on most of the runway, exceeding the nominal 3" P-401 which otherwise could have been employed had the grade correction not been required. At the request of Airport management, Delta conducted a runway strength analysis in February 2009 to analyze the runway for aircraft heavier than 60,000 pounds. The final result was that considering the weakest section of the runway, the pavement is capable of handling 1,200 annual operations by 80,000 pound, dual wheel aircraft for the 20-year design life, and the ultimate strength will allow for much heavier aircraft on a more limited basis as well. **It is recommended that the runway be maintained in accordance with the airport's pavement maintenance plan throughout the planning period.**



Figure CF-5. Six Year Pavement Management Plan.
Chesterfield County Airport



Drawing Date: April 2008

 PAVEMENT CONSULTANTS INC.

SOURCE:
PAVEMENT CONDITION REPORT,
VIRGINIA DEPARTMENT OF AVIATION, 2008.



www.deltaairport.com

SIX YEAR PAVEMENT MANAGEMENT PLAN CHESTERFIELD COUNTY AIRPORT

DRAWN BY:

LKH

CHECKED BY:

KSK

SCALE:

NTS

DATE:

OCTOBER 2010

EXHIBIT
4-7

For the 20-year planning horizon, this may include periodic crack-sealing and repainting. Future asphalt overlays – or mill and replace operations – of the runway are anticipated towards the end of the planning cycle, unless a significant upturn in projected traffic occurs and necessitates earlier action. Rehabilitation of the runway pavement is anticipated to present a low risk of sub grade or pavement failure. With the exception of the outer 20-feet of the western edge south of the TW "C" intersection, the runway tolerated the reconstruction in 2007 with an excellent response, exhibiting no movement even under construction loads. As the current runway is now significantly stronger than before the 2007 reconstruction, future construction should be readily accommodated.

2. Taxiway and Taxilane Analysis

FAA Advisory Circular 150/5300-13, "Airport Design" presents design standards for taxiway and taxilane development. A taxiway is defined as a path established for the taxiing of aircraft from one part of the airport to another. A taxilane is defined as the portion of the aircraft parking area used for the access between taxiways and aircraft parking positions.

Additions or improvements to an airport taxiway system are typically undertaken to increase airport capacity, for operational efficiency, and to enhance safety. An efficient runway/taxiway will increase an airport's ability to handle arriving and departing aircraft, as well as expedite ground movements between the runway and terminal areas.

a. Taxiways

The existing taxiway system at FCI consists of a full parallel taxiway, Taxiway 'A', which provides a dual use entrance/exit taxiway to each end of Runway 15-33. Taxiway 'D' extends perpendicular from Taxiway 'A' connecting it to the south GA apron. Taxiways 'C' and 'E' serve as exit taxiways perpendicular to the runway and Taxiway 'A'. Taxiway 'A' does not currently meet FAA design standards for runway/taxiway separation. Standard separation for an ARC C-II facility with instrument approach



procedure visibility minima below $\frac{3}{4}$ mile is 400 feet, whereas the existing separation between the runway and taxiway at FCI is 375 feet. A Modification of Airport Design Standards (MOS) was approved by the FAA on November 27, 2006 for the non-standard separation between Runway 15-33 and the parallel taxiway. The FAA determined that the separation is adequate as long as the critical aircraft is no larger than the G-IV. **Although it is recommended that the parallel taxiway remain in its current location given the projected critical aircraft will not exceed the parameters established in the MOS, a discussion of the challenges required to meet design standard separation will be presented in Chapter Six, Alternatives.** Taxiway 'A' and associated connecting taxiways are scheduled to receive nominal pavement overlay during Fall 2009 that will increase the weight bearing capacity to 80,000 pounds.

Taxiways 'A', 'B', 'C', 'D' and 'E' are currently 40 feet in width and the standard width is 35 feet. **It is recommended that the widths be reduced at the time of scheduled rehabilitation.**

The parallel taxiway was originally constructed in 1971 at 4400-feet as 3" P-401 on 12" P-209. An 1100-foot extension to the north was constructed in 1984 as 5" P-401 on 10" P-304, and in 1987 the original southern 1100-foot portion was overlaid with an additional 3" P-401. An additional nominal 3" P-401 overlay will occur in the fall of 2009. The taxiway currently exhibits no signs of subgrade failure or structural pavement failure. Extensive cracking has occurred over the years at the longitudinal joints and many of the transverse joints. Management strategies including crack sealing have been successful in maintaining the structural integrity of the pavement. Given the apparent durability of the taxiway it is anticipated to tolerate the construction loads with minimal impact. If this occurs, then the pavement may be regarded as sound to endure future overlays or mill-and-replace operations so long as the subgrade continues to perform. **Routine crack sealing and pavement repainting will be required throughout the planning horizon.**

Similar to a runway, taxiways also have object free areas. The Taxiway Object Free Area



(TOFA) clearing standards prohibit service vehicle roads, parked airplanes, and above ground objects, except for objects that need to be located in the TOFA for air navigation or aircraft ground maneuvering purposes. The TOFA is centered on the taxiway, and for Group I aircraft, the TOFA is 89 feet wide. Group II aircraft require a 131 feet wide TOFA. **The existing TOFAs at FCI meet design standards for Group II aircraft and should be maintained throughout the planning period.**

b. Taxilanes

Taxilanes have less restrictive object free area standards than taxiways. For Group I aircraft, the standard taxilane object free area (TLOFA) width is 79 feet, and for Group II the width is 115 feet. However, for both safety area and object free areas, the minimum required width may also be calculated based on the wingspan of the most demanding aircraft expected to utilize the taxilane. Existing taxilanes at FCI are located primarily on the terminal and north apron areas (Group II), and between the T-hangars (Group I).

New auto parking has been constructed to support the north apron which eliminated the taxilane access to the T-hangar area. A new taxilane has been constructed from the north terminal apron to provide access, allowing pilots line-of-sight for inbound traffic from the T-hangar area. However, proposed corporate hangars on the north apron would significantly minimize the line-of-sight to oncoming aircraft. **Consequently, to ensure the efficient flow of traffic, it is recommended that a taxilane turnout be constructed in Phase I, and dual parallel taxilanes, for use as designated inbound and outbound traffic, be considered for ultimate development.** Exhibit 4-8 illustrates the turnout and parallel taxilanes.

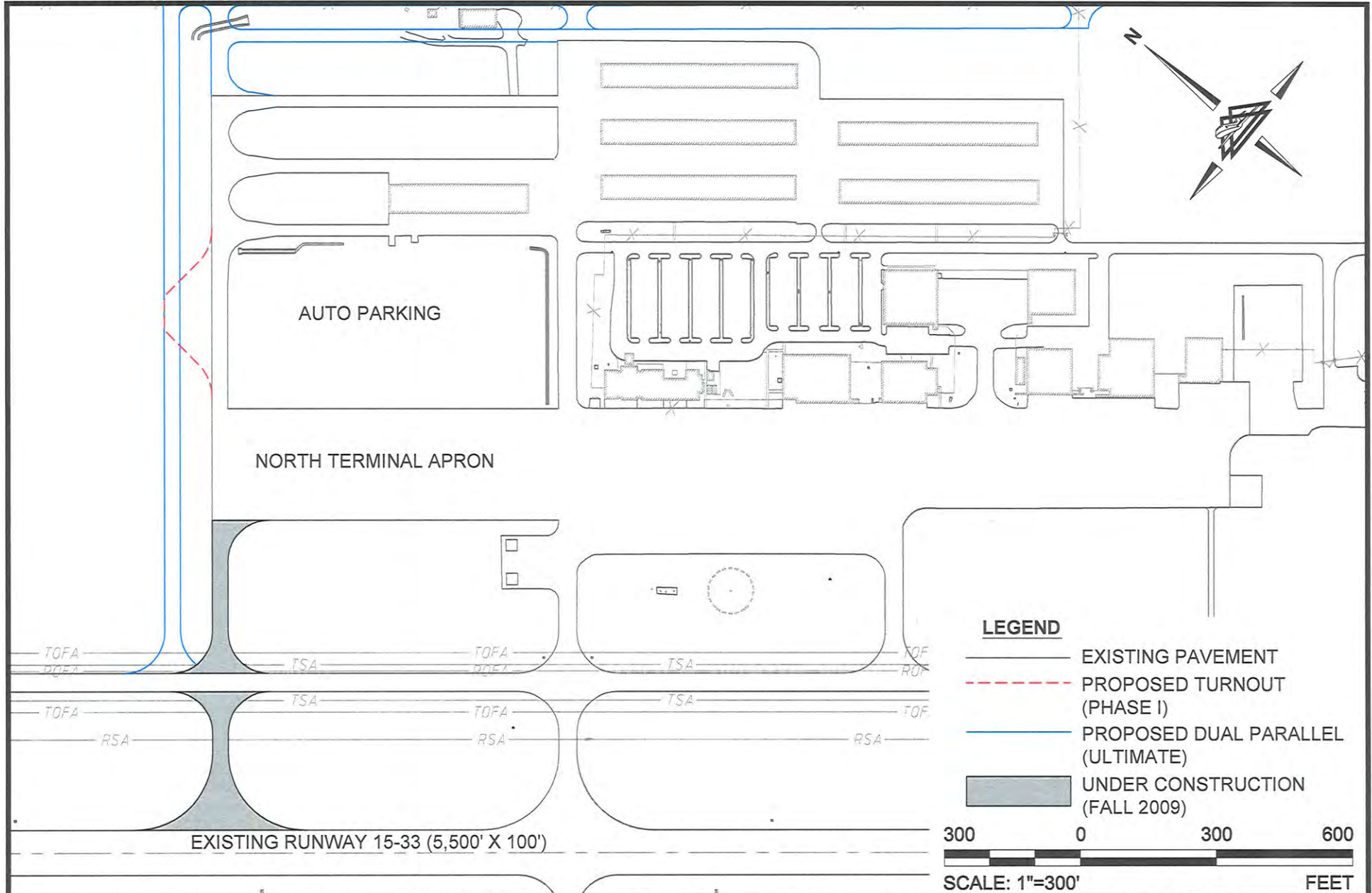
The condition of the taxilane pavements in the T-hangar areas varies considerably based on the age of the pavements. Pavements date from original construction in the 1970's to the latest paving around hangars "E" and "F" in 2007. The majority of the pavement however, including all pavements around hangars "A", "B", "C", and "D", were most recently milled-and-replaced in the mid 1990's. However, many portions of the t-hangar



taxilanes are exhibiting signs of subgrade failure, such as large depressions, water infiltration from below, and rutting. Because the t-hangar area sits in the lowest area of the airport and adjacent wetlands at the same elevation, the high water table and organic nature of the soils are contributing to the pavement failure.

As such, it is not envisioned that a future mill-and-replace repair will be appropriate for these pavements. Instead it is more likely that a full depth reconstruction, possibly to include mechanical or chemical subgrade stabilization (or both) will be required. Given the thin asphalt sections on these pavements, which varies from 2" to 3", milling cannot be accomplished without disturbing the base stone, and the base stone is likely to be saturated and not able to be re-stabilized. This is a similar situation to that experienced in the parking lot repair completed in 2009; similar challenges should thus be anticipated for repairs to the T-hangar pavements.





www.deltaairport.com

CONCEPTUAL T-HANGAR ACCESS-TURNOUT (PH I) & DUAL PARALLEL (ULT) CHESTERFIELD COUNTY AIRPORT

DRAWN BY:

LKH

CHECKED BY:

CMA

SCALE:

1" = 300'

DATE:

OCTOBER 2010

**EXHIBIT
4-8**

3. NAVAIDs

Navigational Aids (NAVAIDs) are a system of electronic and visual aids that assist pilots with navigating their aircraft in a safe and orderly manner during take-off, approach, and landings. Air navigation, with the advent of Global Positioning Systems (GPS), now has an economic and efficient system that can allow every airport in the country to have a navigational aid without requiring ground based equipment. The Wide Area Augmentation System (WAAS) is an expansion and enhancement of GPS that includes integrity broadcasts, differential corrections, and additional ranging signals. Recommendations related to the pursuit of additional GPS navigational support is presented in the following section.

4. Instrument Approach Procedures

a. Runway 15

As highlighted by the IFR windrose data presented in Chapter Two, Exhibits 2-3 and 2-5, Runway 15 is the preferred approach during instrument meteorological conditions approximately 30 percent of the time. Therefore, the instrument approach procedures for Runway 15 are a key element in maintaining airport operational efficiency in all-weather conditions.

There is currently an RNAV (GPS) instrument approach to Runway 15 with established LNAV minima of 680 MSL and one mile visibility. The only ground based approach for Runway 15, a VOR procedure, was cancelled in September 2008 due to decommissioning of equipment. The ongoing NAVAID study being prepared under direction of the Virginia Department of Aviation (DOAV) includes consideration of a VOR/DME (FAK VORTAC) or VOR/DME-A (RIC VORTAC) approach which would improve all-weather capability of the runway and airport with no equipment cost. The study also includes an aeronautical survey to enable development of LPV minima for the existing RNAV (GPS) and reduction of visibility to $\frac{3}{4}$ mile with installation of Medium



Intensity Approach Lighting System (MALS). **The MALS is recommended in Phase II.** The County has also provided feedback to the State on the draft study requesting restoration of a ground based approach procedure, as well as the satellite based approach procedure with visibility of less than ¾ mile. The extension of Runway 15 or the reduction of LPV visibility minima to lower than ¾ miles will require the County to achieve land use control over a greater area as previously discussed in Section 3.e., RPZs.

b. Runway 33

There are currently two instrument approach procedures to Runway 33, an RNAV (GPS) and an ILS or LOC approach. The RNAV (GPS) offers LPV minima as low as 470 MSL and ½ mile visibility and the ILS offers minima as low as 418 MSL (200 AGL) and ½ mile visibility. **No additional instrument approach procedures are under consideration for Runway 33 at this time.**

5. Airfield Lighting System and Visual Approach Aids

a. Airport Beacon

The airport's rotating beacon was installed in 1992 and is mounted atop a tower located between the FBO/maintenance hangar and a corporate hangar. The beacon is operational and in good condition. However, it is becoming increasingly difficult to locate bulbs to support routine maintenance. **Therefore, beacon replacement should be planned within the next five years (Phase I).**

b. Runway and Taxiway Lighting

Runway 15-33 at FCI is equipped with standard High Intensity Runway Lights (HIRLs) and the taxiway edge lights are medium intensity taxiway lights (MITLs). The lights were installed with cans and conduit in 2007 and are expected to meet the airport's needs throughout the 20-year planning period unless changes in design standards or



technological advances require the system's replacement. **Both the HIRLs and MITLs are currently in good to excellent condition, depending on location, and should be maintained throughout the planning period.**

c. Visual Approach Aids

Runway 15

Runway 15 is equipped with a four-box PAPI unit. The units were installed in 1999 and are in good condition. **The PAPI system should be maintained throughout the planning period.**

Omni-directional REILs are also installed on the Runway 15 end. The REILs were installed in 2007 and are in excellent condition. **The REIL system should be maintained through the planning period.** The ongoing DOAV NAVAID study includes consideration of approach lighting for Runway 15; the recommended system is a Medium Intensity Approach Lighting System (MALS). The County has also requested the addition of Runway Alignment Indicator Lights (RAIL) to the proposed MALS to produce a MALSR installation. The additional lighting would provide a one-half mile visibility credit rather than the one-quarter credit from MALS. This addition will also require implementation of the largest RPZ and require additional land acquisition for RPZ control and approach lighting system installation.

Runway 33

Runway 33 is equipped with a four-box PAPI and is in good condition. **The PAPIs should be maintained throughout the planning period.**

A MALSR system is located on the Runway 33 end and it is listed in good condition. **The MALSR system should be maintained throughout the planning period.**



No replacement of existing visual approach aids is anticipated unless changes in design standards or technological advances require such.

6. General Aviation Aircraft Parking Requirements

General aviation aircraft parking requirements vary widely depending on the percentage of transient aircraft using the airport as well as the number of based aircraft owners who choose to tie down their aircraft on the ramp in lieu of leasing hangar space.

a. Transient Aircraft Parking Requirements

Transient aircraft parking requirements typically comprise the largest demand for apron space requirements. Transient aircraft are defined as those aircraft not based at the facility. For the purpose of this analysis, peak day transient operations from the forecast chapter were used to determine apron space requirements.

On-site observations during this Master Plan Update, reviews of local FBO service records, and interviews with FBO management and the airport manager documented current transient operational activity. **Table 4-14** details the transient aircraft activity for the planning period.

Table 4-14
Chesterfield County Airport
Transient Aircraft Activity

	2008	2013	2018	2027
Transient OPS/Busy Day	126	135	144	161
Transient Aircraft/Busy Day	63	68	72	81
Single Engine	43	46	48	54
Multi-Engine	10	11	12	13
Turbo-Jet	8	8	9	10
Rotorcraft	2	2	3	3

Source: Delta Airport Consultants, Inc. Analysis

Apron space allocations for the footprint of typical transient aircraft at FCI are estimated at 250 square yards (sq. yds.) for single engine aircraft, 500 sq. yds. for multi-engine



(piston)/turbo-prop aircraft, 900 sq. yds. for turbo-jet aircraft and 200 sq. yds. for other aircraft (rotorcraft); these allocations do not include Group II circulation space. For the purpose of this analysis, it is assumed that as specified in AC 150/5300-13, 50 percent of the daily transient aircraft will be on the apron simultaneously during a busy day. **Table 4-15** presents the apron requirements for transient aircraft for the 20-year planning horizon.

Table 4-15
Chesterfield County Airport
Transient Aircraft Apron Requirements (One-Half Transient Activity)

Aircraft Types	2008 (SY)	2013 (SY)	2018 (SY)	2027 (SY)
Single Engine	(22) 5,500	(23) 5,750	(24) 6,000	(27) 6,750
Multi-Engine	(5) 2,500	(6) 3,000	(6) 3,000	(7) 3,500
Turbo-Jet	(4) 3,600	(4) 3,600	(5) 4,500	(5) 4,500
Rotorcraft	(1) 200	(1) 200	(2) 400	(2) 400
Total Requirements	(32) 11,800	(34) 12,550	(37) 13,900	(41) 15,150

Note: (0) = Number of aircraft spaces
Source: Delta Airport Consultants, Inc. Analysis

b. Based Aircraft Apron Parking Requirements

Based aircraft, as opposed to transient aircraft are permanently stored at the airport. For those owners not requiring hangar storage, adequate space for parking and storage of these aircraft on the apron should be provided. These based aircraft storage spaces are part of the total apron tie-down area. Historically, aircraft types which are routinely stored or parked on the apron are the less expensive single engine aircraft types. The larger and more expensive aircraft, such as the multi-engine aircraft types, are normally stored in hangars.

The square yardage (SY) per based aircraft used for this analysis is the same as the transient aircraft formula and does not include Group II circulation requirements. It is estimated that approximately 10 percent of the based single engine aircraft will require apron tie-down space in addition to the four spaces required for flight school and rental



aircraft. Utilizing the based aircraft forecast and the projected fleet mix in Chapter Three, based aircraft tie-down requirements were forecast for the planning period. These requirements are presented in **Table 4-16**.

Table 4-16
Chesterfield County Airport
Based Aircraft Apron Tie-down Requirements (SY)

	2008	2013	2018	2027
Single Engine (spaces)	17	18	19	20
Tie Down Requirement (SY)	4,250	4,500	4,750	5,000

Source: Delta Airport Consultants, Inc. Analysis

c. Total General Aviation Apron Space Requirements

The preceding discussions have identified the total demand for apron space for the planning period. Apron size requirements have been established for both based and transient aircraft. **Table 4-17** presents the apron requirements for the planning period. **The analysis indicates that the existing general aviation apron space is adequate for demand until the end of the planning period 2027, at which time the need should be reevaluated and additional apron constructed as needed.** There are no identified traffic flow difficulties on the parking apron at this time. **It is recommended that these facilities be maintained throughout the planning period.**



Table 4-17
Chesterfield County Airport
General Aviation Apron Requirements

Aircraft Types	2008 (SY)	2013 (SY)	2018 (SY)	2027 (SY)
Transient Aircraft				
Single Engine	(22) 5,500	(23) 5,750	(24) 6,000	(27) 6,750
Multi-Engine	(5) 2,500	(6) 3,000	(6) 3,000	(7) 3,500
Turbo-Jet	(4) 3,600	(4) 3,600	(5) 4,500	(5) 4,500
Rotorcraft	(1) 200	(1) 200	(2) 400	(2) 400
Sub-Total	(32) 11,800	(34) 12,550	(37) 13,900	(41) 15,150
Based Aircraft				
Single Engine	(17) 4,250	(18) 4,500	(19) 4,750	(20) 5,000
Total Apron Requirements	16,050	17,050	18,650	18,900
Existing Pavement	19,000	19,000	19,000	19,000
Deficiencies (-)/Capacity (+)	+2,950	+1,950	+350	-1,150
Total Tie-Down Requirements	49	52	56	61
Existing Tie-Downs	85	85	85	85
Deficiencies (-)/Capacity (+)	+36	+33	+29	+24

Note: (0) = Number of aircraft spaces

Source: Delta Airport Consultants, Inc. Analysis

E. LANDSIDE FACILITY REQUIREMENTS

Landside facilities include airport buildings, fuel farm, passenger and general aviation terminal building, hangar space, automobile parking, and fencing. The landside facility requirements were developed from a review of the Inventory and Forecast chapters of this study, consistent with FAA and industry guidelines.

I. Terminal Building

A terminal study, completed and approved by DOAV in 1999, forecasted demand through 2018 based upon total operations as detailed in the approved forecast from the



previous Master Plan Update (1992-2012). The total operations for 2018 were approximately 106,000, which resulted in a recommendation of an additional 8,900 square feet for the prior planning period. A terminal expansion in 2003 added an additional 8,400 square feet for a total of 23,000 square feet. This MP Update has forecasted (based upon 2003 VATSP data) approximately 106,000 annual operations in 2027. **Consequently, the existing terminal building space is sufficient for the planning period.**

2. Airport Access and Automobile Parking

a. Airport Access

As noted in the Inventory Chapter, the airport is located approximately 14 miles south of Richmond with access via State Route 10 to Whitepine Road, then to Airfield Drive. The Owner, FBO, and users have requested consideration of a second surface access via Cogbill Road be evaluated during this planning study. Both Route 10 and 288 are primary arteries serving the greater Richmond area. However, the feasibility of a second surface access via Cogbill Road was reviewed. Existing access to primary arteries was considered as well as the benefits of constructing a second access. It was determined that since both Route 10 and 288 are easily accessed via Airfield Drive there is no justification to construct a second access at this time.

However, as a crosswind and/or parallel runway may be considered as ultimate development, a secondary surface access would be necessary to provide access to the north side of the airfield. **It is recommended that a second surface access be considered for ultimate development in association with either a crosswind or parallel runway. Conceptual locations of such additional access will be presented in Chapter Six, Alternatives.**

In the interim, the County has requested the development of a temporary emergency vehicle access road. The emergency access road would be planned early in



the ultimate phase and would not be constructed so as to interface with the ultimate crosswind or parallel runways.

b. Automobile Parking

The existing parking lot contains 96 spaces which date from the original construction of the Airport in the 1970's; these are the spaces located immediately in front of the terminal building. A parking lot expansion to the south in 1995 added an additional 96 spaces. A third expansion completed in 2009 added an additional 72 spaces. This additional parking area has eliminated the taxilane access to the T-hangar area. Access to the T-hangar area has been provided by the construction of a new taxilane adjacent to the north apron area.

FBO and other corporate tenants on the airfield provide parking for their employees, and thus employee parking was not a factor in estimating parking requirements for this study. For planning purposes, the number of automobile parking spaces required equals the sum of the peak hour pilots and passengers (2.5 pilots and passengers per peak hour operation). The results are shown in **Table 4-18**, which indicates the number of public automobile parking facilities is adequate for current and future demand.

Table 4-18
Chesterfield County Airport
Public Automobile Parking Requirements

	2008	2013	2018	2027
Peak Hour Operations	38	41	44	49
Peak Hour Pilots and Passengers	95	103	110	123
Total Spaces Required	95	103	110	123
Total Existing Spaces	136	207	207	207
Deficiency (-)/Capacity (+)	+41	+104	+97	+84

Source: Delta Airport Consultants, Inc. Analysis

The oldest set of parking spaces had a thin asphalt overlay applied in the 1990's which also overlaid the concrete gutter pan and reduced the curb reveal. Otherwise, the parking lots are untouched from original construction and are heavily oxidized and markings



severely faded. The two sets of older pavements are also heavily cracked in many locations and grass grows through many of the cracks, and at the curb and gutter interfaces.

Although no evidence of severe subgrade failure is evident, such as rutting, sinkholes, or pavement depressions, it is not reasonable to assume the original set of 96 spaces will endure the planning period without structural repair. The surface cracking present will likely develop into potholes and portions of the thin-lift overly will begin to delaminate, particularly where the concrete was overlaid. Experience on the parking lot expansion project completed in 2009 indicates that milling of these existing pavements may create extensive problems by disrupting the subgrade. Subgrades in the area proved to be saturated, poorly drained and contained large amounts of organic matter and topsoil, and expansive clayey soils. These conditions required extensive reworking and mechanical stabilization of the subgrade.

As these parking spaces are the most heavily utilized at the airport and are located immediately in front of the terminal, it is important for the County from an airport marketing standpoint, to maintain them structurally and visually. It is unlikely that seal coating and crack sealing alone will accomplish this given the age and frequent use of these pavements. As such, **a full rehabilitation of the older parking lot pavement should be anticipated early in the 20-year planning horizon, and the 1995 parking lot may require structural rehabilitation towards the end of the planning cycle. At a minimum both parking lots should be seal coated, crack sealed, and re-marked as early as feasible.**

3. Hangar Facilities

Hangar space requirements include demand generated by based aircraft, normal fixed base operations, and corporate use. The following assumptions were made to determine hangar space requirements for based aircraft at the FCI:

- 90% of all single engine aircraft will require hangar space through the planning



period

- 100% of all multi-engine aircraft will require hangar space
- 100% of all turbojet aircraft will require hangar space
- 100% of all others (i.e., rotorcraft) will require hangar space

FCI currently has six T-hangar structures, five 20-unit and one 10-unit, as well as seven conventional hangars. Of the seven conventional hangars, only two are available for public use. The private use conventional hangars were excluded from the calculation of existing available hangar space. Planning ratios for each type of aircraft were based on discussions with the FBO and airport users, and are illustrated in **Table 4-19**.

Table 4-19
Chesterfield County Airport
Hangar Planning Ratios

Aircraft Types	Conventional Hangars	T-Hangars
Single Engine	5%	95%
Multi-Engine Piston	50%	50%
Turbo-Prop	50%	50%
Business Jet	100%	0%
Rotorcraft	100%	0%

Source: Delta Airport Consultants, Inc.

The conventional hangar space standards that were used for each of the aircraft type to determine the required hangar space are shown in **Table 4-20**. These dimensions represent the optimum space required for aircraft maneuvering. They do not include additional spacing required for related hangar operations or aircraft circulation.

Table 4-20
Chesterfield County Airport
Hangar Space Standards

Aircraft Types	Conventional Hangars (SF)
Single Engine	1,200
MEP/Turbo-Prop	1,400
Business Jet	3,000
Rotorcraft	1,200

Note: MEP= Multi-Engine Piston

Source: Delta Airport Consultants, Inc.



The total hangar requirements are highlighted in **Table 4-21**. The planning model used to produce the table indicates the airport has adequate small T-hangar space to meet the demand until 2027, while additional large T-hangars are needed immediately. It also indicates a deficiency in conventional hangar space. Current conditions indicate no waiting list for small T-hangars or conventional hangar space. There is however a waiting list for the larger T-hangars with 62 foot wide entry doors. **It is recommended that additional large T-hangars be constructed as soon as feasible and the demand for hangar space be re-evaluated on an on-going basis to ensure the facilities provided meet the growing needs of the airport.**

Table 4-21
Chesterfield County Airport
Total Hangar Requirements

Aircraft Types	2008		2013		2018		2027	
T-Hangar (Units)	Small	Large	Small	Large	Small	Large	Small	Large
T-Hangar Demand	91	12	91	12	95	12	103	12
Existing T-Hangars	100	10	100	10	100	10	100	10
Deficiency(-)/Capacity (+)	+9	-2	+9	-2	+5	-2	-3	-2
Conventional Hangar Area (SF)								
Single Engine	4,800		4,800		6,000		6,000	
Multi-Engine	16,800		16,800		16,800		16,800	
Turbo-Jet	30,000		36,000		42,000		54,000	
Rotorcraft	6,000		6,000		6,000		6,000	
Total SF Required	57,600		63,600		70,800		82,800	
Existing Space	24,400		24,400		24,400		24,400	
Deficiency(-)/Capacity (+)	-33,200		-39,200		-46,400		-58,400	

Source: Delta Airport Consultants, Inc. Analysis

4. Perimeter Fencing and Security

A perimeter fence with access control via a series of pedestrian and vehicle gates currently surrounds airport property and is in good condition. The airport participates in



the DOAV General Aviation Volunteer Security Certification Program and FCI has established security procedures based on “Best Practices” for GA airports. FCI’s security measures combine an extensive security camera system with the perimeter fence and access gates. **It is recommended that the fence and security items be maintained throughout the planning period.**

F. SUPPORT FACILITIES

Support facilities play a vital role in the operation of FCI. The sizing, location, and phasing of these facilities must provide flexibility to accommodate the dynamic aviation industry. Support facilities that will be discussed in this section include the following:

- Aviation Fuel Storage and Delivery
- Aircraft Rescue and Fire Fighting
- Airfield Electrical Vault
- Airfield Maintenance and Snow Removal Equipment (SRE) Building
- Automated Weather Observing System (AWOS)
- Air Traffic Control Tower

1. Aviation Fuel Storage and Delivery

As mandated by the EPA and FAA, FCI has prepared a Spill Prevention Countermeasures and Control (SPCC) plan dated March 5, 2009 to comply with 40 CFR 112 and EPA regulations. A Storm Water Pollution Prevention Plan (SW3P) dated March 31, 2009 has also been prepared for the airport consistent with Virginia Department of Conservation and Recreation (DCR) and the EPA.

There are a total of three (3) 12,000 gallon underground storage tanks (USTs) at FCI owned by the County. Two tanks contain jet fuel and the other contains 100LL Avgas. Aircraft refueling is provided by the FBO, and is accomplished using fuel trucks provided by the FBO. The trucks include two Jet-A trucks with 2,200 and 2,000 gallon capacities, and one 100LL truck with a 1,200 gallon capacity. Based upon discussions with the FBO



and Owner, the existing fuel storage facility meets the current and projected demand and was upgraded in the 1990's to meet U.S. Environmental Protection Agency (EPA) standards at that time.

The existing fuel farm is located adjacent to the perimeter fence and is highly visible from Airfield Drive. The equipment is outdated and requires a significant amount of maintenance time due to many non-standard, customized parts and solutions to maintain function and meet current SWPPP, SPCC and DEQ requirements. The Owner would prefer the fuel farm to be relocated to a more secure area of the airfield. The relocated fuel farm would have above ground storage tanks (ASTs) to comply with recommendations from VDEQ, as they prefer ASTs.

The County has requested VDEQ to provide correspondence stating their recommendation. It is the Owner's desire to analyze the relocation of the fuel farm in order to best meet the environmental requirements and the long term needs of the airport.

It is recommended the fuel farm be relocated in Phase II.

Also, an alternative fuel site in a separate location is recommended within the planning period to allow fuel to be purchased 24 hours a day, 7 days a week directly by aircraft operators. The location of this proposed fueling site and potential relocation of the fuel farm will be discussed in the Alternatives chapter.

2. Aircraft Rescue and Fire Fighting (ARFF)

Federal Aviation Regulations (FAR) Part 139 establishes levels (or indexes) of fire fighting protection for certified commercial service airports. General aviation airports such as FCI are not required to have specific on-airport rescue and fire fighting staffing, however, it should be noted that FCI does have the equivalent capability for Index "A" response. Fire protection for the airport is provided by the Chesterfield County Fire Department Station No. 15 located on airport property and the station's equipment includes one rapid intervention ARFF vehicle. The Owner advises that the Chesterfield



County Fire Department owns and maintains the ARFF vehicle and although the airport is not required to maintain ARFF capability, **the Fire Department intends to replace the vehicle during Phase I of the planning period.**

No improvements are currently planned for the helicopter parking pad at the Fire Station. Although there has been some discussion about the possible relocation of the Fire Station, the County maintains interest in establishing an approach/takeoff path to the north in the future.

3. Airfield Electrical Vault

The airfield electrical vault is located adjacent to the maintenance hangar with a back-up generator for providing power in the event of an emergency. **The facility is in excellent condition and offers sufficient capacity to accommodate the additional electrical service required with the proposed extension of Runway 15-33.**

4. Airfield Maintenance and Snow Removal Equipment (SRE) Building

Airfield maintenance equipment and snow removal equipment are currently stored in the maintenance facility hangar that is approximately 80 feet by 40 feet. FAA AC 150/5220-18A, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials*, defines FCI as a medium size airport for SRE calculations, having at least 420,000 but less than 700,000 square feet of total paved runway. **Exhibit 4-9** (Table 3-3 from AC 150/5220-18A) notes typical storage space allocations for support items for small, medium, and large/very large airports.



Items under Support Area	Airport Size ¹		
	Small-Sized Airport ²	Medium-Sized Airport	Large and Very Large-Sized Airports
	Square feet (m)	Square feet (m)	Square feet (m)
Snow Desk ⁴	100 (9)	144 (13)	200 - 400 (19 - 37)
Supervisor's Office ⁴	120 (11)	140 (13)	140 (13)
Mechanic's Office	100* (9)	150 (14)	150 (14)
Administrative Area ⁴	200* (19)	200 (19)	400 (37)
Training Room ⁴	300 (28)	400 (37)	400 (37)
Lunch Room ⁴	Combine with training room	300 (28)	600 (56)
Kitchen ⁴	Combine with training room	Combine with lunch room	200 (19)
Rest Room/Lavatory for Men and Women (or local building code) ⁴	300 (28)	500 (46)	700 (65)
Lockers ⁴	Combine with Rest Rooms	500 (46)	700 (65)
Sleeping Quarters ³	56 (5)	56 (5)	56 (5)
Bunk area per person			
Parts Area associated with snow removal operation	600* (56)	800 (74)	1000 (93)
Parts Area associated directly to snow vehicles	200 (19)	300 (28)	400 (37)
Lubrication, Oil, Grease Storage	100-150 (9 - 14)	150 - 200 (14 - 19)	150 - 200 (14 - 19)
Welding Area	200* (19)	200 (19)	400 (37)
Recycled Oil and Used Anti-freeze	150 (14)	200 (19)	200 (19)
Mechanic's Bench Area (along walls)	100 (10)	200 (19)	400 (37)
Repair Bay – Number of Bays and square footage per repair bay	1* 600 (56)	1 1000 (93)	2 1000 (93)
Cleaning Bay	600* (56)	1000 (93)	1000 (93)
Emergency First Aid Room ⁴	Combine with lunch room	Combine with training room	75 (7)

NOTES:

- SEE AC 150/5220-18A, PARAGRAPH 1-2 OF CHAPTER 1 FOR DEFINITIONS OF AIRPORT SIZES.
- AIRPORTS WITH LESS THAN 225,000 SQUARE FEET (20,910 m²) OF TOTAL PAVED RUNWAY WILL NOT NECESSARILY NEED ITEMS MARKED WITH AN ASTERISK (*).
- CERTAIN AIRPORT OPERATORS MAY DEEM IT NECESSARY TO HAVE SLEEPING QUARTERS.
- SMALL AIRPORTS MAY HAVE A SEPARATE BUILDING THAT HOUSES EQUIPMENTS, CHEMICALS WHILE ANOTHER BUILDING, SUCH AS THE TERMINAL, HOUSES ADMINISTRATIVE FUNCTIONS AND CREW FACILITIES.

SOURCE: FAA AC 150/5220-18A, TABLE 3-3.



TYPICAL STORAGE SPACE ALLOCATIONS FOR SUPPORT ITEMS CHESTERFIELD COUNTY AIRPORT

**EXHIBIT
4-9**

DRAWN BY: IKH CHECKED BY: KSK SCALE: NONE DATE: OCTOBER 2010

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As noted in the exhibit, a **building size of 7,000 square feet is recommended for medium size airports to accommodate each support area as well as additional space to store the snow removal equipment and snow and ice control materials.** Also, the recommended building size anticipates a 10 to 15 percent future growth with respect to personnel space and snow equipment parking as noted in the AC. The existing maintenance equipment and SRE building is approximately 3,200 square feet. The Sponsor also reports that approximately 20 percent of the building becomes unusable when standing water results from significant rainfall. **It is recommended that the SRE building be replaced in Phase II to meet FAA sizing guidelines and to address flooding issues in the current building.**

Additionally, a review of FAA Advisory Circular (AC) 150/5220-20, *Airport Snow and Ice Control Equipment*, was conducted to determine the size and number of plows needed at FCI. Using approximately 2 million square feet of primary area to be cleared, the equation outlined in the AC yielded a rate of approximately 1,400 pounds per hour to be cleared at FCI as noted in **Table 4-22.**

Table 4-22
Chesterfield County Airport
Snow Removal Equipment Calculation

Calculation	Result
2,000,000 sq. ft. primary area to be cleared x 1/12' =	166,666 feet ³
166,666 feet ³ x 25 lbs/feet ³ (industry standard snow density ¹) =	4,166,667 lbs
4,166,667 lbs / .75 efficiency =	5,555,555 lbs
5,555,555 / 2 hours (clearance time ²) =	2,777,778 lbs/hr
2,777,778 / 2,000 lbs/ton =	1,388 tons/hour
Use:	1,400 tons/hour

Sources: ¹Industry standard snow density = 25 lbs/feet³ per FAA AC 150/5220-20.

²Table I-2, Clearance Times for Non-Commercial Service Airports (40,000 or more operations = 2 hours), FAA AC 150/5220-20.



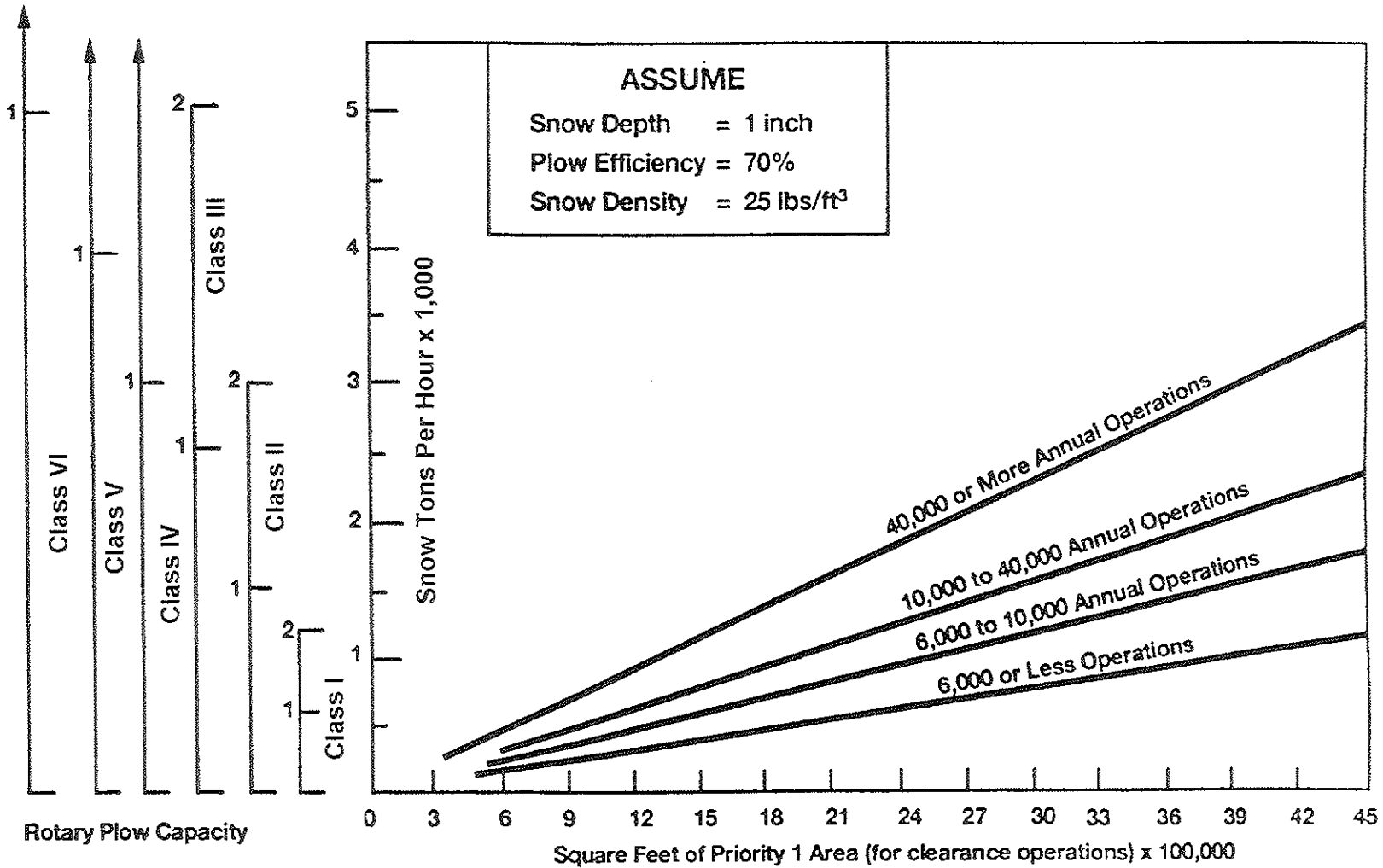
Exhibit 4-10 (Figure 2-4 from AC 150/5220-20) indicates that one Class II plow would be adequate to clear 1,400 tons per hour. The AC also notes that for non-commercial airports having over 10,000 operations and at least 15 inches of snow should have a minimum of one high-speed rotary plow supported by two displacement plows of equal capacity.

As Richmond, VA reports an annual average snowfall of 14 inches, **it is recommended that the County acquire a Class II rotary plow and consider acquisition of a second displacement plow. Additional support vehicles such as sweepers and wheel loaders are also recommended for consideration** as the AC notes they are usually needed to complete the removal of snow from all operations areas.

5. Automated Weather Observing System (AWOS)

FCI has an AWOS-3 unit located near the segmented circle, between Taxiways 'C' and 'D'. The AWOS-3 has limited access as it is not currently connected to the National Aerospace Data Interchange Network (NADIN). Such connection improves awareness of the airport to transient pilots by allowing access to the weather information via distant ground locations and avionics onboard aircraft. **It is recommended that the AWOS-3 be linked to the NADIN. (The County is pursuing the connection to NADIN and anticipates completion by spring 2010.)**





SOURCE:

FAA AC 150/5200-20; FIGURE 2-4.



ROTARY PLOW SELECTION CHART CHESTERFIELD COUNTY AIRPORT

EXHIBIT
4-10

DRAWN BY:

LXH

CHECKED BY:

KSK

SCALE:

NONE

DATE:

OCTOBER 2010

6. Air Traffic Control Tower

An Air Traffic Control Tower (ATCT) is a terminal facility, which through the use of air/ground communications, visual signaling and other devices, provides air traffic control (ATC) services to airborne aircraft operating in the vicinity of an airport and to aircraft operating on the ground at the airport. FCI does not currently have an ATCT. An initial feasibility study (see **Appendix E**) for an ATCT was conducted in conjunction with this study. The findings indicated that annual operations would need to be approximately 140,000 prior to justification of a contract tower facility. A significant increase in military and air taxi operations could reduce the number of general aviation operations required to approximately 106,000; various operational mix combinations are highlighted in the CTBX report. **It is the owner's desire to pursue an ATCT when feasible, and as such, a conceptual site location will be identified on the ALP and noted as ultimate phased development.**

G. ZONING AND LAND USE

Chesterfield County's Comprehensive Plan was most recently amended in February 2008 and serves as a mechanism to manage future growth of the county. The plan recommends that steps be taken to protect the airport from non-compatible land uses that would conflict with airport operations. Section 19-507 of the Code of Chesterfield County details zoning regulations that are in place to protect the Part 77 surfaces. **It is recommended that FCI gain control over its existing and future RPZs via fee simple or easement acquisition to prevent incompatible land uses. It is recommended that existing obstructions to the Part 77 surfaces (as to be documented within the ALP drawing set) be cleared to remain in compliance with Section 19-507 of the Code of Chesterfield County.**



H. OTHER FACILITIES

At the County's request, potential locations for the following facilities will be discussed during the alternatives analysis and if feasible based upon coordination with the FAA and DOAV, identified on the ALP.

- Qwest Learning Center – an aviation focused educational facility
- Public Observation Park – a designated area for public viewing of aircraft operations
- Pilot Activity Area – a designated activity area for tenant pilots

A general location for the facilities will be noted on the ALP as appropriate, as well as, any conceptual design elements that may be available from the County.

I. FACILITY REQUIREMENTS SUMMARY

This chapter presented the facility requirements for the continued development of FCI. Facility requirements were predicated on the existing and forecasted aviation demand. These requirements are needed to satisfy the short and long range aviation needs of the community. Recommendations contained herein are intended to optimize the operational efficiency, effectiveness, flexibility, and safety of the airport. Chapter Six, Alternatives Analysis, will discuss and illustrate the optimum size and timing of the facility development that is most appropriate to accommodate the facility requirements. Prior to construction, projects may require an Environmental Assessment per the National Environmental Policy Act (NEPA) regulations. Phasing for each recommended project is described in **Table 4-23**.



Table 4-23
Chesterfield County Airport
Project Phasing

Project Description	Phase I	Phase II	Phase III	Ultimate
Environmental Assessment	✓			
Obstruction Removal	✓			
Construct Taxilane Turnout	✓			
Establish Instrument Approach Procedure – RW 15 LPV	✓			
Link Existing AWOS with the NADIN	✓			
Replace Rotating Beacon	✓			
Construct Large T-hangars	✓			
Land Acquisition - RPZ control	✓			
Auto Parking Pavement Rehabilitation	✓			
Construct Pilot Activity Area	✓			
Relocate Fuel Farm		✓		
Construct Conventional Hangars	✓	✓	✓	✓
Airfield Pavement Maintenance	✓	✓	✓	✓
Extend Runway 15-33 & Parallel Taxiway		✓		
Construct Blast Pads		✓		
Extend RSAs w/Extension of Runway		✓		
Replace ARFF Vehicle		✓		
Construct Alternative Fuel Site		✓		
Replace SRE Building		✓		
Acquire Class II Rotary Plow		✓		
Acquire Displacement Plow, Sweeper, and Wheel Loader		✓		
Construct Public Observation Park		✓		
Install MALS(R) – RW 15		✓		✓
Construct Aviation Education Facility			✓	
Construct Small T-hangars			✓	✓
Construct Parallel Runway			✓	
Construct Crosswind Runway				✓
Construct Dual Taxilanes to North and East				
Airfield Development Area				✓
Construct 2 nd Surface Access				✓
Construct ATCT				✓
Construct Aircraft Parking Apron				✓

Notes: = Development item to be presented and discussed in the alternatives chapter.

Wetland mitigation may be necessary for obstruction removal and other than No Action alternatives.

Source: Delta Airport Consultants, Inc.



Chapter Five

ENVIRONMENTAL OVERVIEW

A. INTRODUCTION

The objective of this inventory is to document all environmentally sensitive areas governed by the *National Environmental Policy Act* of 1969 (NEPA) within the existing airport property boundaries, however the assessment of impacts is not a part of this report. This inventory follows applicable Federal Aviation Administration (FAA) guidelines and examines the 18 impact categories identified in FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*. NEPA has a significant impact on airport planning and development by requiring that environmental impacts of proposed airport development be considered early and throughout the entire planning process. Environmental feasibility is as critical as economic, engineering or operational feasibility in determining the airport's future development. In accordance with FAA Orders 1050.1E, *Environmental Impacts: Policies and Procedures*, and 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instruction for Airport Actions*, a brief examination of each of the impact areas shall be conducted for the impact categories listed below:

- | | |
|--|--|
| 1. Air Quality | 11. Light Emissions and Visual Impacts |
| 2. Coastal Resources | 12. Natural Resources, Energy Supply, and Sustainable Design |
| 3. Compatible Land Use | 13. Noise |
| 4. Construction Impacts | 14. Secondary (Induced) Impacts |
| 5. Department of Transportation Act; Section 4(f) | 15. Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks |
| 6. Farmlands | 16. Water Quality |
| 7. Fish, Wildlife, and Plants | 17. Wetlands |
| 8. Floodplains | 18. Wild and Scenic Rivers |
| 9. Hazardous Materials, Pollution Prevention, and Solid Waste | |
| 10. Historical, Architectural, Archeological, and Cultural Resources | |



FAA Order 1050.1E addresses the types of impacts and the thresholds that determine if an impact is considered significant. Each of the impact categories is reviewed, in relation to Chesterfield County Airport (FCI), throughout the following sections. Again, it is critical to note that this review only reports existing conditions as they relate to FAA guidelines. Compliance with NEPA guidelines, permitting, and coordination activities with agencies will be conducted prior to the development of any projects illustrated on the Airport Layout Plan (ALP).

B. AIR QUALITY

The Virginia Department of Environmental Quality (DEQ) is primarily responsible for the regulation of state-wide air quality as well as air quality in Chesterfield County. On the federal level, the United States Environmental Protection Agency (EPA) establishes air quality goals and sets standards under the federal Clean Air Act (CAA). For airport projects, the FAA is responsible for the assessment of air quality impacts to comply with the NEPA as well as compliance with the CAA's General Conformity Rule.

The CAA requires that the EPA establish National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to the health of the public and the environment. The EPA defines ambient air within the Code of Federal Regulations (40 CFR Part 50), as "that portion of the atmosphere, external to buildings, to which the general public has access."

The EPA established two types of NAAQS. *Primary standards* are pollutant limits that protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. *Secondary standards* are pollutant limits that protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The EPA Office of Air Quality Planning and Standards (OAQPS) established NAAQS for six principal pollutants, referred to as the "criteria" pollutants. These criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM), and lead (Pb). The primary and secondary NAAQS standards for these pollutants are provided in **Table 5-1**. Notably, O₃ and certain types of PM (those formed secondarily), are not emitted directly by an air pollutant source. Rather, in certain meteorological conditions, these pollutants are formed (created) from pollutant precursors. For instance, in the presence of



sunlight, emissions of volatile organic compounds (VOC) react with emissions of nitrogen oxides (NO_x) to form O₃.

Table 5-1
U.S. Environmental Protection Agency
National Ambient Air Quality Standards

Pollutant	Time Period	Value	Type of Standard ^a
Carbon monoxide (CO)	1-hour average	35 ppm	Primary
	8-hour average	9 ppm	Primary
Sulfur dioxide (SO ₂)	3-hour average	0.5 ppm	Secondary
	24-hour	0.14 ppm	Primary
	Annual Arithmetic Mean	0.03 ppm	Primary
Nitrogen dioxide (NO ₂)	Annual Arithmetic Mean	0.053 ppm	Primary & Secondary
Ozone (O ₃)	8-hour average ^b	0.075 ppm	Primary & Secondary
Particulate matter, diameter ≤ 10 µm (PM ₁₀)	24-hour average	150 µg/m ³	Primary & Secondary
Particulate matter, diameter ≤ 2.5 µm (PM _{2.5}) ^b	24-hour average	35 µg/m ³	Primary & Secondary
	Annual Arithmetic Mean	15 µg/m ³	Primary & Secondary
Lead (Pb)	Quarterly average	1.5 µg/m ³	Primary & Secondary
	Rolling 3-month average	0.15 µg/m ³	Primary & Secondary

Notes: ^a Primary standards protect public health. Secondary standards protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

^bThe Clean Air Act requires that EPA review air standards every five years to insure standards reflect the latest scientific evidence.
ppm = parts per million by volume µg/m³ = micrograms per cubic meter of air

Source: U.S. Environmental Protection Agency, 2009.

Regions that comply with the NAAQS are designated as “attainment” areas. However, areas that do not meet the NAAQS are designated from marginal to extreme “non-attainment” areas. Under the CAA and associated amendments, state and local air pollution agencies have the authority to adopt and enforce ambient air quality standards (AAQS) more stringent than the NAAQS. The state of Virginia has adopted the NAAQS. **Chesterfield County has been designated an attainment area by the U.S. EPA for all criteria pollutants as of January 6, 2010.**



C. COASTAL RESOURCES

1. Coastal Management

To adhere to Section 307 of the Coastal Zone Management Act of 1972, as amended, it is mandatory that a determination be made that any direct federal activity, federally funded activity, or federally permitted activity is consistent with the goals and objectives of the State's Coastal Zone Management Program. **FCI is located within Virginia's coastal zone; therefore, a Consistency Determination would be required for future development. In addition, coordination with the Virginia Department of Conservation and Recreation (DCR) would be required to comply with the Chesapeake Bay Preservation Act.**

2. Coastal Barriers

The Coastal Barriers Resources Act of 1982 (PL 97-348) prohibits projects receiving federal assistance from development within the Coastal Barrier Resource System. This system consists of underdeveloped coastal barriers along the Atlantic and Gulf coasts.

A Consistency Determination for impacts to coastal barriers would be required for future development, as FCI is located inside of the coastal zone.

D. COMPATIBLE LAND USE

The FAA has established guidelines for land use compatibility around airports with respect to noise in FAA Order 1050.1E. These guidelines are presented in **Table 5-2**. The Day Night Average Sound Level (DNL) represents noise exposure events over a 24-hour period. The FAA has adopted DNL as the standard metric to measure sound exposure on and near an airport. Incompatible land uses generally include residential areas, and noise sensitive community facilities, such as schools and churches, located within the DNL 65 or greater noise contours. Conversely, agricultural, commercial, and industrial uses are commonly compatible with aircraft noise and activity.



Table 5-2
Chesterfield County Airport
14 CFR Sound Exposure/Land Use Compatibility Guidelines

Land Use	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N ¹	N ¹	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N ¹	N ¹	N ¹	N	N
Public Use						
Schools	Y	N ¹	N ¹	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y ²	Y ³	Y ⁴	Y ⁴
Parking	Y	Y	Y ²	Y ³	Y ⁴	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware and farm equipment	Y	Y	Y ²	Y ³	Y ⁴	N
Retail trade--general	Y	Y	25	30	N	N
Utilities	Y	Y	Y ²	Y ³	Y ⁴	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y ²	Y ³	N	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y ⁶	Y ⁷	Y ⁸	Y ⁸	Y ⁸
Livestock farming and breeding	Y	Y ⁶	Y ⁷	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y ⁵	Y ⁵	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables	Y	Y	25	30	N	N

Key to Table 5-2

SLUCM = Standard Land Use Coding Manual

Y(Yes) = Land Use and related structures compatible without restrictions.

N(No) = Land Use and related structures are not compatible and should be prohibited.

NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30 or 35 dB must be incorporated into design and construction of structure.

Notes for Table 5-2

¹ Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

² Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas or where the normal noise level is low.

³ Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas or where the normal noise level is low.

⁴ Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas or where the normal level is low.

⁵ Land use compatible provided special sound reinforcement systems are installed.

⁶ Residential buildings require an NLR of 25.

⁷ Residential buildings require an NLR of 30.

⁸ Residential buildings not permitted.

Source: Federal Aviation Regulations 14 CFR Part 150, effective January 18, 1985.



The area surrounding airport property is characterized by light industrial, mixed use, and parkland. In addition, several large residential subdivisions are located north of the airport including the developments of Five Forks Village, Ravenswood, Land O Pines, Kingsland Glen, and King's Forest. No incompatible residential development exists within the DNL 65 noise contour as highlighted in Section N, Noise, of this chapter. Exhibit 2-7 illustrates Chesterfield County's land use plan as depicted in the County's Comprehensive Plan, August 2006. The Chesterfield County Comprehensive Plan is currently under revision and is anticipated for release in 2011.

Land use around an airport is also a concern within the Runway Protection Zone (RPZ). The FAA prefers the airport owner control the defined RPZ area to enhance protection of people and property on the ground. Such control includes the clearing and maintenance of incompatible objects and activities. FCI does not currently own all of the land within the existing RPZs. Chapter 6, Alternatives, proposes methods to obtain control of the existing RPZs.

The Code of Chesterfield County, VA, Section 19-507 lists height exemptions and limitations established as overlay zones as they apply to FCI. The purpose of the Code is to prevent the creation or establishment of structures which would constitute hazards or obstructions to aircraft operating to, from or in the vicinity of FCI. As stated in the Code, the height restrictions or floors for the individual zones shall be those planes delineated as surfaces in Part 77.25, Subchapter E (Airspace), of Title 14 of the Code of Federal Regulations. The zones listed in the Code include the airport, approach, transitional, conical, and primary zones. The County has obtained several aviation easements to protect these 14 CFR Part 77 surfaces.

It is also appropriate to discuss and review several of the public facilities located in the vicinity of the airport. Several schools, childcare facilities, nursing homes, and churches are located within a two mile radius of the airport; however, none of these facilities are impacted by the existing DNL 65 noise contour or are located within the RPZs.



E. CONSTRUCTION IMPACTS

Construction impacts are ordinarily temporary, resulting from actual construction activities. Potential construction-related impacts will include the temporary degradation of noise, air and water quality. When construction activities related to airport development do occur in the area of FCI, specific areas of concern should include:

1. Noise from construction equipment and related activities of the site

Noise levels at the airport, generated primarily from construction equipment would temporarily increase during various stages of airport construction. They would be higher in the immediate vicinity of construction activity, but would drop off significantly a short distance from the site.

2. Noise and dust from delivery of materials through residential areas

Noise and dust from the delivery of materials to the site would pose only minor impacts to residential areas and to the traveling public. Overall, the impacts of noise and dust from delivery of equipment and materials would be for a short duration and would be considered negligible.

3. Water pollution from erosion, siltation, and other pollutants

Risk to water quality during construction would be from erosion and siltation created during clearing, grubbing, earthmoving, and excavating activities. The means of reducing the risk would involve both temporary and permanent control measures to ensure that erosion and siltation are kept to a minimum. These measures are outlined on FAA Advisory Circular 150/5370-10E, Item P-156, *Temporary Air and Water Pollution, Soil Erosion, and Siltation Control*. A Storm Water Pollution Prevention Plan (SWPPP) dated March 31, 2009 has been prepared for the airport consistent with Virginia Department of Conservation and Recreation (DCR) and the U.S. Environmental Protection Agency (EPA). The SWPPP would be updated upon completion of any



development affecting the contents of the plan.

4. Air pollution from burning debris

Air pollution, as a result of the open burning of construction debris, may be permitted provided there is strict adherence to all local and state laws, ordinances, and regulations.

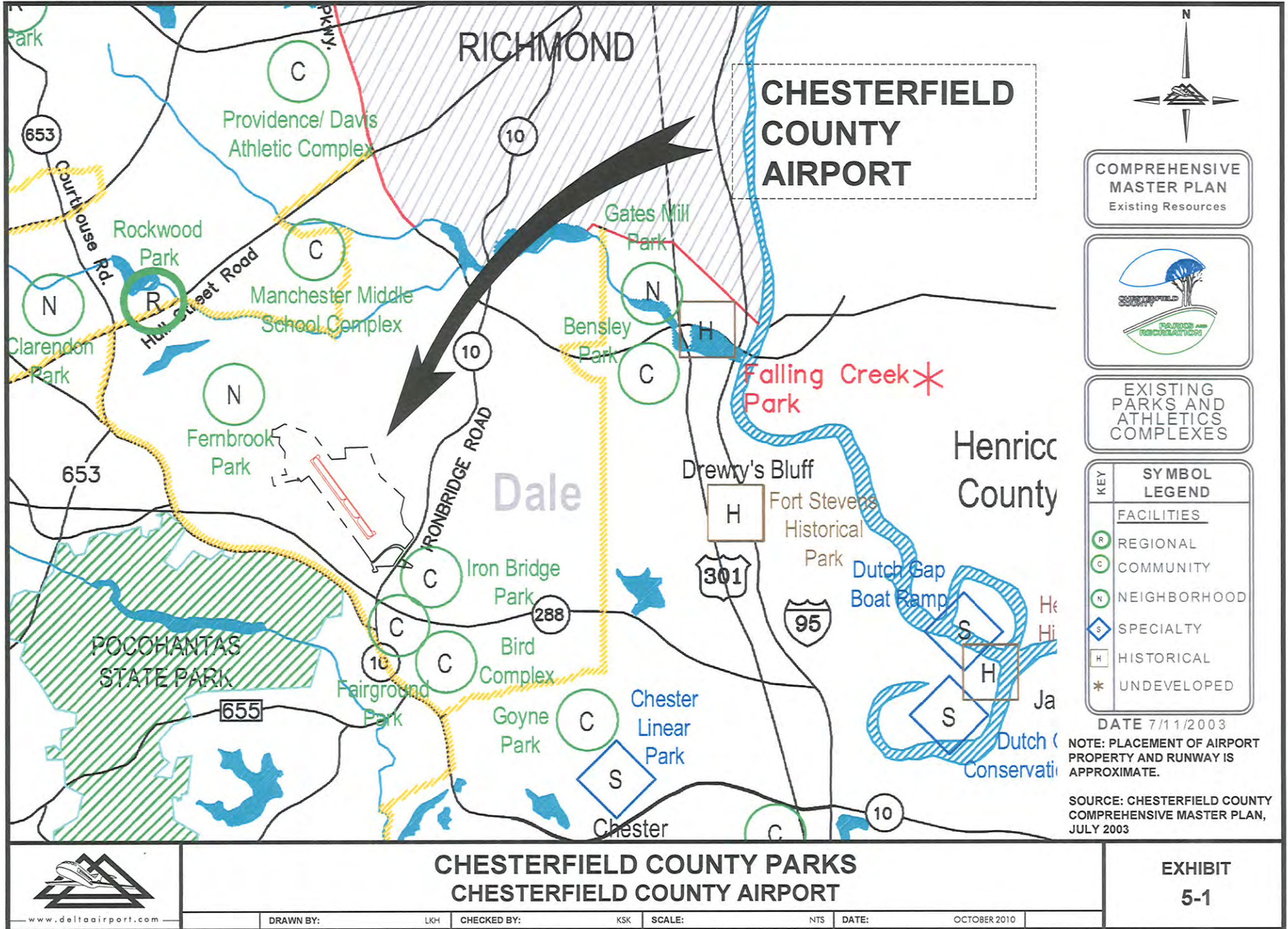
5. The use and mitigation of borrow and waste areas

Airport development may require significant excavation of unsuitable material, placement of embankments, and the use of materials such as aggregates, and bituminous and Portland Cement Concrete. The stockpiling of the construction and excavation materials may be visually displeasing to some traveling in the area. This is, however, a temporary condition and would pose no permanent impacts.

F. DEPARTMENT OF TRANSPORTATION ACT; SECTION 4(f)

Section 4(f) of the Department of Transportation Act states that any project requiring the use of any publicly owned land from a public park, recreation area, or from a historic site of national, state or local significance shall not be approved unless there is no feasible and prudent alternative to the use of such land. **There are no Section 4(f) lands within the Chesterfield boundaries of FCI; however, several parks are located in the airport vicinity as illustrated in Exhibit 5-1.** Pocahontas State Park is situated southwest of FCI and community parks including Iron Bridge Park and Fairgrounds Park are located south of the airport. Fernbrook Park, a neighborhood park, is located northwest of FCI. Should impacts to these parks occur due to implementation of the preferred development, coordination during the environmental assessment will be necessary to determine if the impacts are significant.





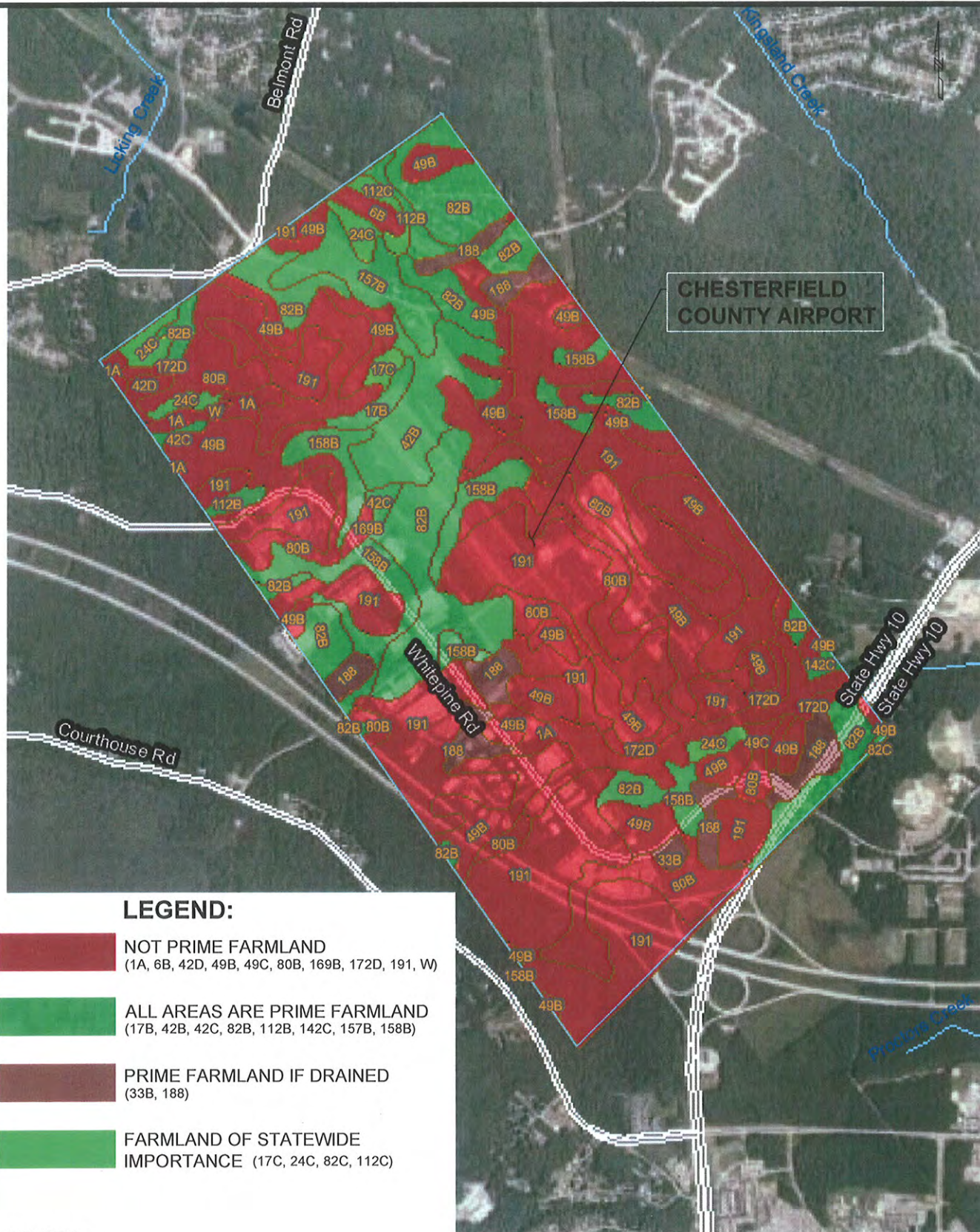
G. FARMLANDS

Farmlands are protected under the Farmland Protection Policy Act (FPPA). According to Order 1050.1E, the FPPA authorizes the Department of Agriculture (USDA) to develop criteria for identifying the effects of Federal programs on the conversion of farmland to non-agricultural uses to minimize the extent to which those programs contribute to the unnecessary and irreversible conversion of prime, unique, and statewide or locally important farmlands to nonagricultural uses.

Guidelines established by the USDA under the FPPA for identifying the effects of federal programs on the conversion of farmland to nonagricultural uses became effective August 1, 1989. However, according to the provisions of the FPPA, it does not apply if the following exists: 1) the land for development was purchased prior to August 6, 1984 and 2) the potential area for development is zoned for airport development.

According to 7CFR Part 658.2 (a) of the FPPA, the airport property does not meet the definition of farmland because it is “already in or committed to urban development,” and therefore exempt from the FPPA. Prime farmlands in the airport vicinity are depicted in Exhibit 5-2.





LEGEND:

- NOT PRIME FARMLAND
(1A, 6B, 42D, 49B, 49C, 80B, 169B, 172D, 191, W)
- ALL AREAS ARE PRIME FARMLAND
(17B, 42B, 42C, 82B, 112B, 142C, 157B, 158B)
- PRIME FARMLAND IF DRAINED
(33B, 188)
- FARMLAND OF STATEWIDE IMPORTANCE (17C, 24C, 82C, 112C)

SOURCE:

NATURAL RESOURCES CONSERVATION SERVICES - SOIL SURVEY AREA: CHESTERFIELD COUNTY, VIRGINIA /
SURVEY AREA DATA: VERSION 7, DEC. 19, 2008 / AERIAL DATED JUNE 24-25, 2003



www.deltaairport.com

PRIME FARMLAND CHESTERFIELD COUNTY AIRPORT

DRAWN BY: LKH CHECKED BY: KSK SCALE: NTS DATE: OCTOBER 2010

EXHIBIT
5-2

H. FISH, WILDLIFE, AND PLANTS

1. Endangered and Threatened Species

Section 7 of the Endangered Species Act, as amended, requires federal agencies to ensure that any proposed action does not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of associated habitat. Section 7a (3) also requires that consultation occur with the USFWS regarding the presence of threatened and endangered species within the proposed project area. Under the act, an “endangered” species is defined as any species that is in danger of extinction throughout all, or a significant portion, of its range. A “threatened” species is considered to be any species that is likely to become an endangered species within the foreseeable future. **In a letter dated September 8, 2009, USFWS indicated that no existing endangered or threatened species are located in the airport vicinity (Appendix F).**

2. Biotic Communities

Biotic communities may be directly or indirectly affected by aviation development and aviation activities. Specifically, development that affects existing watercourses or vegetation may alter wildlife habitat in the area, resulting in potentially significant impacts to flora and fauna. **In a letter dated September 8, 2009, the U.S. Fish and Wildlife Service (USFWS) noted that no designated critical habitat is located within FCI boundaries and surrounding areas (Appendix F).**

I. FLOODPLAINS

Floodplains are a critical element to both the environment and the community. They perform vital natural functions including the following: temporary storage of floodwater, moderations of peak floodflows, maintain water quality, groundwater recharge, erosion and sediment control, and provision of habitat for wildlife. Also, they provide recreational grounds and establish an aesthetic quality to natural areas.



Exhibit 5-3 illustrates the Flood Insurance Rate Map (FIRM) for Chesterfield County, Virginia, Community Panel Numbers 5100350058B and 5100350086B Effective Date: March 16, 1983. **The FIRM indicates that FCI is located in Zone C, areas of minimal flooding, and outside of the 100-year floodplain.**

J. HAZARDOUS MATERIALS, POLLUTION PREVENTION, AND SOLID WASTE

Typically there are two general categories of solid waste that must be evaluated with a proposed project: 1) the increase in quantity of solid waste generation, and 2) capacity of the proposed solid waste disposal facility.

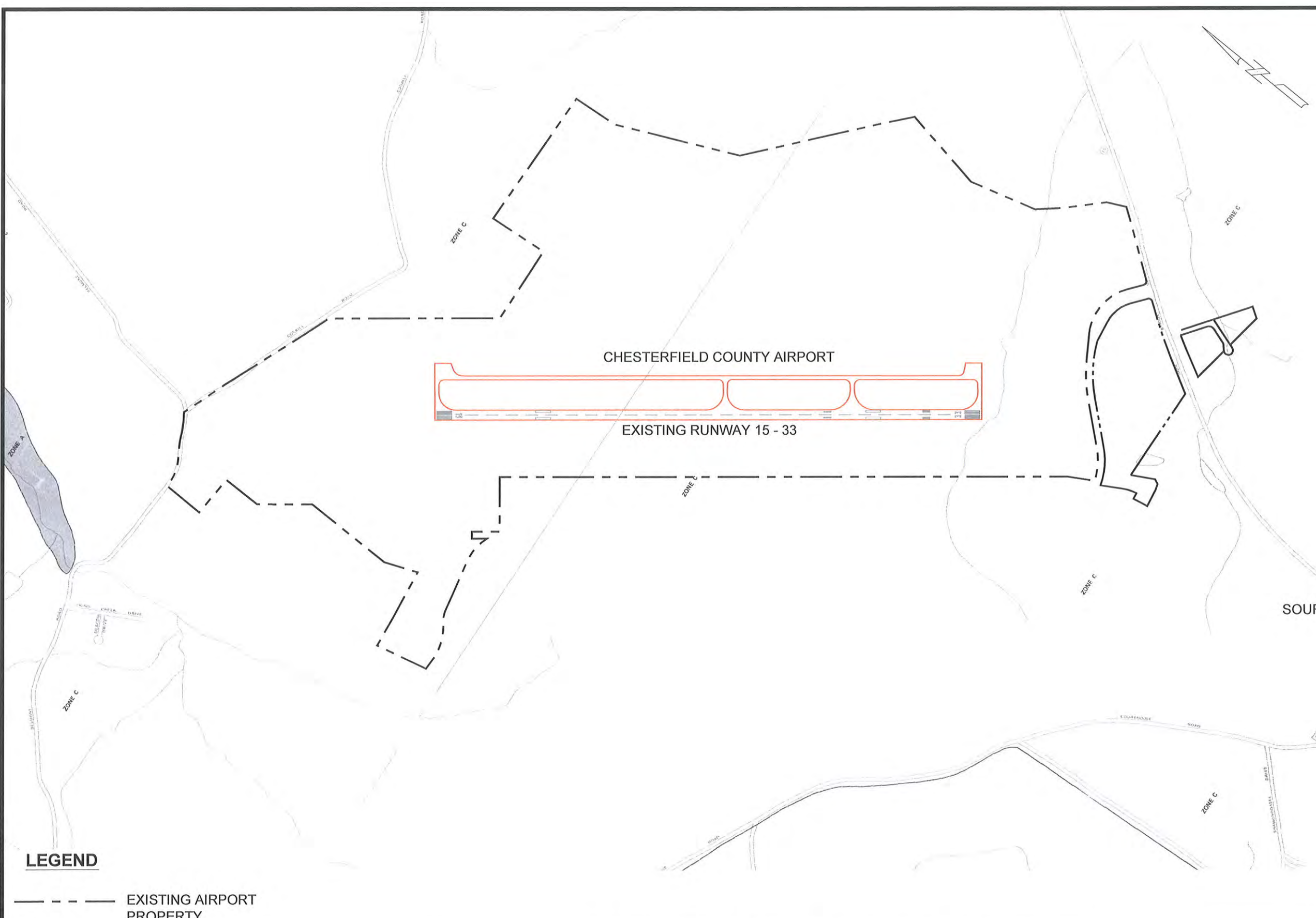
1. Solid Wastes

There are two landfills in the airport vicinity. The Shoosmith Brothers landfill is a privately owned, commercial landfill currently in operation and is located approximately four miles south of the airport. Located approximately three miles south of the airport, Chesterfield County operates a separate landfill transfer station for county residents. Previous landfill operations at this site have been capped.

Solid waste impacts ordinarily are associated with terminal development, because the majority of solid waste is generated in the terminal area as a result of passenger activity and concession operations. The waste that is generated from daily airport activities consists of normal refuse associated with public facilities and does not require any extraordinary collection methods or disposal areas.



DRAWING: 06131-ext-firm maps.dwg LAYOUT: L1



KEY TO MAP

500-Year Flood Boundary	---
100-Year Flood Boundary	- - -
Zone Designations*	ZONE A1 ZONE A5 ZONE B
100-Year Flood Boundary	---
Base Flood Elevation Line With Elevation in Feet**	573
Base Flood Elevation in Feet Where Uniform Within Zone**	IEL 0871
Elevation Reference Mark	RM7x
Zone D Boundary	---
River Mile	+M1.5
North Arrow	20+00

**Referenced to the National Geodetic Vertical Datum of 1929

***EXPLANATION OF ZONE DESIGNATIONS**

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
AI-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A00	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the confining drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For additional map panels, see separately printed Index to Map Panels.

INITIAL IDENTIFICATION:
JANUARY 10, 1979

FLOOD HAZARD BOUNDARY MAP REVISIONS:
JUNE 2, 1978

FLOOD INSURANCE RATE MAP EFFECTIVE:
MARCH 16, 1983

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

SOURCE:

NATIONAL FLOOD INSURANCE PROGRAM	
FIRM FLOOD INSURANCE RATE MAP	FIRM FLOOD INSURANCE RATE MAP
CHESTERFIELD COUNTY, VIRGINIA (UNINCORPORATED AREAS)	CHESTERFIELD COUNTY, VIRGINIA (UNINCORPORATED AREAS)
PANEL 58 OF 180 (SEE MAP INDEX FOR PANELS NOT PRINTED)	PANEL 86 OF 180 (SEE MAP INDEX FOR PANELS NOT PRINTED)
COMMUNITY-PANEL NUMBER 510035 0058 B	COMMUNITY-PANEL NUMBER 510035 0086 B
EFFECTIVE DATE: MARCH 16, 1983	EFFECTIVE DATE: MARCH 16, 1983
Federal Emergency Management Agency	Federal Emergency Management Agency

LEGEND

--- EXISTING AIRPORT PROPERTY

**FLOOD INSURANCE RATE MAP (FIRM)
CHESTERFIELD COUNTY AIRPORT**

**EXHIBIT
5-3**



DRAWN BY: LKH CHECKED BY: KSK SCALE: NTS DATE: OCTOBER 2010

2. Hazardous Materials

Analysis of this impact category involves the evaluation of three potential areas of impact. These are:

1. The release of any existing undisturbed toxic substances;
2. The release of toxic substances from construction equipment maintenance and construction materials; and
3. The release of toxic substances from any newly constructed facilities.

Hazardous substances known to be found at the airport include aircraft and ground equipment fuel and aircraft deicing fluid. The fuel farm at FCI contains three 12,000 gallon underground storage tanks (USTs), as noted in **Table 5-3**. Two tanks contain jet fuel and the other contains 100LL Avgas. Aircraft refueling is accomplished using three fuel trucks. The fuel farm is located south of the Civil Air Patrol hangar and is accessible from Airfield Drive as well as the south general aviation apron. The fuel tanks at FCI are in compliance with EPA and DEQ regulations. Email correspondence with DEQ indicated the fueling system is in good working condition. **Therefore, it was concluded that there are no impacts resulting from fueling activity.**

Table 5-3
Chesterfield County Airport
Fuel Storage and Dispensing Equipment

Equipment	Capacity	Content Use
UST	12,000 gallons	Jet A
UST	12,000 gallons	Jet A
UST	12,000 gallons	Avgas

Note: UST -- Under Ground Storage Tank
Source: FCI Airport Management
Delta Airport Consultants, Inc. Analysis

The age and condition of the USTs is of increasing concern at airports today. Leaking USTs may contaminate groundwater, surface water and soils. USTs are often used to store petroleum products such as aviation fuel, and hazardous substances such as spent aircraft deicing fluids. A UST is defined as a tank with a capacity of more than 110



gallons that has 10 percent or more of its volume beneath the surface of the ground. As mandated by the FAA, FCI has prepared a Spill Prevention Countermeasures and Control (SPCC) plan dated March 5, 2009 to comply with 40 CFR 112 and EPA regulations.

The EPA prefers above ground storage tanks; however, FCI's tanks are acceptable per EPA regulations. Airport Management has requested the County's Environmental Program Manager inspect the fuel farm and submit a letter of recommendation for future action.

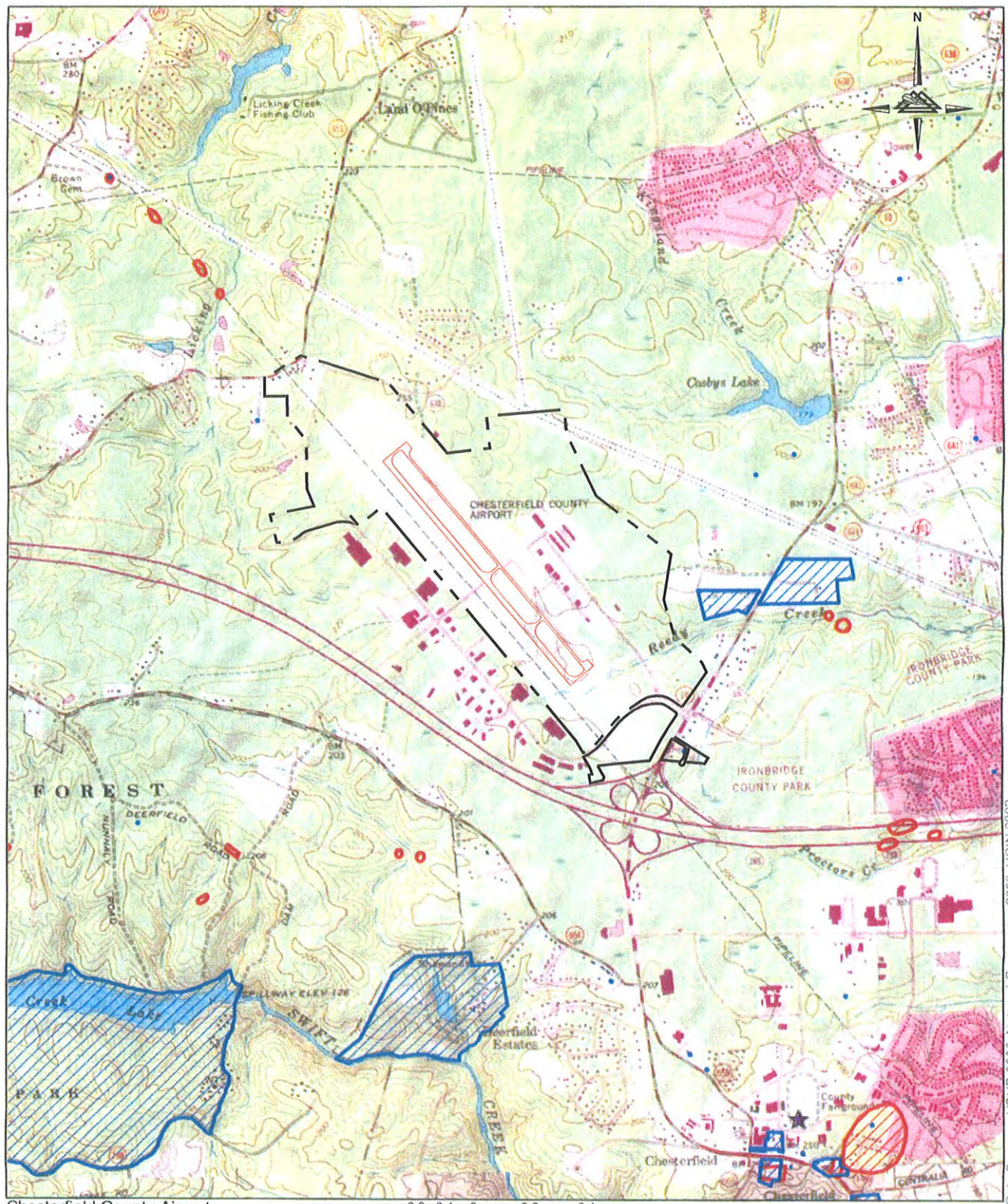
K. HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

The National Historic Preservation Act of 1966, as amended, and the Archeological and Historic Preservation Act of 1974 are the two laws that establish the requirements for determining historic, architectural, archaeological and cultural resource significance within the airport vicinity. Two basic provisions are applicable:

1. The first provision is an initial review to determine if any properties in or eligible for, inclusion in the National Register of Historic Places are within the airport boundaries.
2. The second provision provides for the survey, recovery and the preservation of significant scientific, prehistorical, historical, archaeological or paleontological data when such data may be destroyed or irreparably lost due to a federally licensed or funded project.

The Department of Historic Resources (DHR) is the state agency liable for historic preservation in Virginia. **A map archives search was conducted by DHR in 2008 and found no previously documented architectural or archaeological resources in the airport vicinity, as illustrated in Exhibit 5-4.**





Chesterfield County Airport
December 16, 2008

0.2 0.1 0 0.2 0.4
Miles

SOURCE:
VIRGINIA DEPARTMENT OF HISTORIC RESOURCES,
MAP ARCHIVES SEARCH, DECEMBER 2008

Legend

- architectural resources
- archaeological resources
- AIRPORT PROPERTY
(APPROXIMATE LOCATION)

Data Sources: VDHR 2008, National Geographic 2003, VGIN 2002



www.deltaairport.com

CULTURAL RESOURCES CHESTERFIELD COUNTY AIRPORT

DRAWN BY: LKH CHECKED BY: KSK SCALE: NTS DATE: OCTOBER 2010

EXHIBIT
5-4

L. LIGHT EMISSIONS AND VISUAL IMPACTS

FAA Order 1050.1E requires the operator to consider the extent to which any lighting associated with an airport action will create an annoyance among residents in the airport region. **Airport management reports that no formal complaints have been made from nearby residences.**

M. NATURAL RESOURCES, ENERGY SUPPLY, AND SUSTAINABLE DESIGN

Energy and natural resource impacts of airport activity are related to the amount of energy required to operate aircraft; airport-related service vehicles; airport terminal lighting; and other uses such as heating/air-conditioning. Energy requirements for the airport, with the exception of airport lighting, are largely dependent upon the amount of activity occurring at the airport.

Increased aviation activity levels translate into higher energy requirements for operation of aircraft, vehicles and airport facilities.

Existing demand for electrical power at the airport is within the capacity currently provided.

N. NOISE

Noise, defined as “undesirable sound,” is typically the most significant off-airport environmental impact associated with aircraft operation. Noise is measured in decibels (dB). Aircraft sound levels are quantified for single events using the A-weighted decibel scale (dBA), which was developed to measure sounds with more emphasis on frequencies that can be heard by the human ear.

The FAA’s Integrated Noise Model (INM) Version 7.0, was used to prepare noise contours to evaluate potential aircraft noise effects for the base (2008) scenario. INM is the computer program used to determine the total effect of aircraft noise in an airport environment. INM produces noise contours, which are computer-generated lines that connect points of equal noise



levels resulting from aircraft operations.

The FAA specifies metrics to be used in measuring aircraft noise. The metric used in this analysis is the Day Night Average Sound Level (DNL). DNL is the average cumulative sound level that provides a measure of the total sound energy during a 24-hour period. A 10-decibel (dB) weighting penalty is added to aircraft noise occurring during the nighttime hours (between 10:00 pm and 7:00 am). The 10 dB penalty represents the added intrusiveness of noise events that occur during normal sleep hours when ambient sound levels are typically about 10 dB lower than during daytime hours, because of the annoyance associated with sleep disruption.

Estimates of noise effects resulting from aircraft operations can be interpreted in terms of the probable effect on human activities characteristic of specific land uses. 14 CFR Part 150 guidelines for evaluating land use compatibility with noise exposure are presented in Table 5-2. These guidelines reflect the average response of large groups of people to noise. Therefore, the guidelines might not reflect an individual's perception of an actual noise environment. Compatible or non-compatible land use is determined by comparing the predicted or measured DNL at a specific site with the compatibility guidelines provided in the table. The INM was used to produce aircraft noise contours for DNL 65, 70, and 75. DNL 75 and higher is considered incompatible with most land uses by the FAA, while the DNL 65 is compatible with most land uses. Furthermore, there are some land uses that are compatible with noise levels between DNL 65-75. All land uses are considered to be compatible with noise less than DNL 65.

1. Airport Activity Levels

Because total daily activity is expected to vary throughout the year, noise analyses are based on average annual day activity. This methodology is consistent with that developed in FAA Advisory Circular 150/5020.1, *Noise Control and Compatibility Planning*. Details of annual operational levels are listed for each category of activity in Table 3-15.



2. Fleet Mix Data

The airport fleet mix data used to develop the existing noise exposure contours is listed in **Table 5-4**. Fleet mix refers to the various categories of aircraft operating at an airport. The fleet mix was identified utilizing airport records and the forecast presented in Chapter Three, Table 3-7.

Table 5-4
Chesterfield County Airport
Fleet Mix (2008)

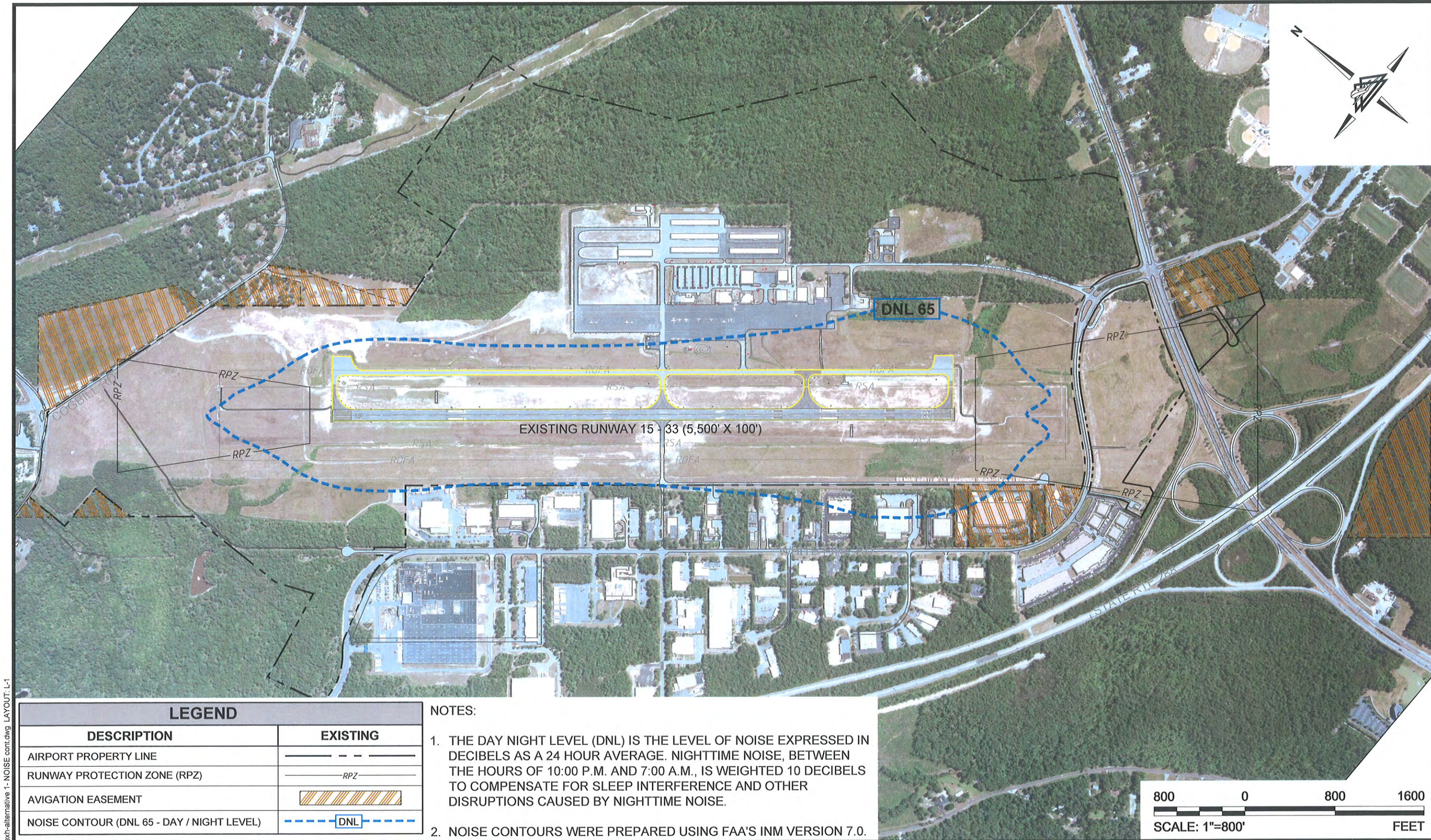
Category	Representative Aircraft Types (INM)
General Aviation Local	General Aviation Single Engine Propeller Fixed (GASEPF) General Aviation Single Engine Propeller Variable (GASEPV) Beechcraft Baron 58P
General Aviation Itinerant (including Air Taxi)	General Aviation Single Engine Propeller Variable (GASEPV) Beechcraft Baron 58P Cessna 441 King Air Citation 550 Gulfstream IV Hawker 800 Challenger 600
Military	Grumman C-2
Rotor	Bell 206 helicopter

Source: Delta Airport Consultants, Inc.

3. Noise Contours

Aircraft activity levels and operational characteristics were programmed into the INM, which produced noise exposure contours of the areas exposed to aircraft noise levels of DNL 65, 70, and 75 in 2008. **Exhibit 5-5** illustrates the DNL 65 existing noise contour. **As shown on the exhibit the DNL 65 noise contour is contained within the airport boundary or in areas of compatible land use.**





LEGEND

DESCRIPTION	EXISTING
AIRPORT PROPERTY LINE	---
RUNWAY PROTECTION ZONE (RPZ)	—RPZ—
AVIGATION EASEMENT	
NOISE CONTOUR (DNL 65 - DAY / NIGHT LEVEL)	

NOTES:

1. THE DAY NIGHT LEVEL (DNL) IS THE LEVEL OF NOISE EXPRESSED IN DECIBELS AS A 24 HOUR AVERAGE. NIGHTTIME NOISE, BETWEEN THE HOURS OF 10:00 P.M. AND 7:00 A.M., IS WEIGHTED 10 DECIBELS TO COMPENSATE FOR SLEEP INTERFERENCE AND OTHER DISRUPTIONS CAUSED BY NIGHTTIME NOISE.
2. NOISE CONTOURS WERE PREPARED USING FAA'S INM VERSION 7.0.

**EXISTING NOISE CONTOURS (2008)
CHESTERFIELD COUNTY AIRPORT**

DRAWN BY: LKH CHECKED BY: KSK SCALE: 1" = 800' DATE: OCTOBER 2010

**EXHIBIT
5-5**



O. SECONDARY (INDUCED) IMPACTS

Induced or secondary impacts are alterations in regional growth and development patterns, such as shifts in residential development and related population distribution and growth, public service demands and changes in business and economic activity brought about by the airport development.

Changes in business activity, to the extent influenced by the airport development can be expected. Alterations in regional growth and development patterns are not anticipated. The economic gains provided by the growth of the airport, include the short-term increase in construction jobs, as well as long-term direct and indirect economic benefits on a regional level from increased airport activity.

P. SOCIOECONOMIC IMPACTS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

According to FAA Order 1050.1E, the principal social impacts of an alternative to be considered in an environmental assessment are as follows: extensive relocation of residents without sufficient replacement housing; relocation of businesses creating a severe economic hardship for the community; disruptions of local traffic patterns that would substantially reduce the levels of service of the roads serving the airport and its surrounding communities; and a substantial loss in community tax base.

Guidelines for evaluating social impacts are presented in Executive Order No. 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Population*. The three general purposes of this executive order are to: (1) focus federal agency attention on human health and environmental conditions in minority and low-income communities with a goal of achieving environmental justice; (2) foster non-discrimination in federal programs that substantially affect human health or the environment; and (3) give minority and low-income communities greater opportunities for public participation in, and access to, public information on matters relating to human health and the environment. The evaluation of environmental justice must determine if the proposed project would cause a "disproportionate impact" to



minority and/or low- income populations.

Children's environmental health and safety risks include those that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or to products which they may use or be exposed.

Airport operations are within the existing airport property, consequently, no disruption to or alteration of surface traffic patterns exist. As the airport is fenced, the safety risk to the general population is low. Also, as no low income housing exists adjacent to the airport, low-income communities are not disproportionately impacted by the airport. **Airport operations do not currently disrupt established communities, disrupt orderly, planned development, alter traffic patterns which may permanently or temporarily restrict traditional community access, or result in appreciable changes in employment. Minority and low-income populations are not being affected by operations at FCI.**

Q. WATER QUALITY

Along with air quality, the quality of water is one of the most sensitive areas of environmental concern. Protection and management of water resources at FCI is mandated by a number of federal laws, regulations and guidelines. Water features are under the jurisdiction of the U.S. Army Corp of Engineers (ACOE) and the Virginia DEQ.

Generally, stormwater runoff consists of surface rainwater with trace elements of fuels, detergents and other pollutants. Typical sources of pollutants in stormwater runoff at airports are associated with aircraft and vehicle maintenance and cleaning, storage of fuels and other petroleum based products, and deicing/anti-icing of aircraft and runways. Non-point sources of water pollution are those which cannot be traced to a specific, identifiable discharge location and can cause sedimentation, eutrophication and biological contamination of surface waters.

Section 402(p) of the Clean Water Act (CWA) requires the EPA to develop permit requirements and to issue permits for stormwater discharges associated with industrial activity. In 1988, the



EPA published a Notice of Proposed Rulemaking that further defined “industrial activity to include airports which have vehicle maintenance shops, material handling facilities, equipment cleaning operations or airport deicing operations.” As a result of the CWA, airports must apply for a National Pollutant Discharge Elimination System (NPDES) permit in relation to the following activities: 1) stormwater discharges associated with industrial activity, 2) discharges from a municipal separate stormwater system serving a population of 250,000 or more and 3) discharges from a municipal separate storm sewer system serving populations of 100,000 to 250,000. A Storm Water Pollution Prevention Plan (SWPPP) dated March 31, 2009 has been prepared for the airport consistent with DCR and EPA policies. The SWPPP would be updated upon completion of any development affecting the contents of the plan.

Stormwater runoff can be expected to increase as a result of the creation of additional impervious surfaces, such as new buildings, parking lots, and roadways. The greatest potential impact to surface water resources is from erosion and sedimentation during construction activities. Construction impacts may also include the alteration of natural drainage patterns, water contamination, runoff due to site preparation (land clearing, grubbing, grading and filling), fuel spillage of construction equipment and pavement of the parking lots and roadways. The day-to-day effects of additional impervious surface area will be the alteration of local drainage patterns, possible loss of ground water recharge, oil and grease drippage from automobiles and trucks, increased flow rates in localized areas, increased risk of contamination of runoff through accidental spills of chemicals, waste materials, detergents, fertilizers, and petroleum products.

Runoff from FCI is conveyed to well defined natural and manmade drainage features. The natural drainage ways of the site carry mostly intermittent or wet weather flows while the bulk of stormwater management structures are hardened with bedrock, rip rap, and cobblestones. With the exception of the developed portion of the airport and clear zones, the watersheds in and on the facility exist in a combination of mixed hardwood and pine forests. Safety areas are mowed, and drainage channels contain only emergent herbaceous and scrub shrub vegetation.

Chesterfield County Airport does not have any existing water quality concerns.



R. WETLANDS

Wetlands are defined in Executive Order (E.O.) No. 11990, as “those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.” Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats and natural ponds. Wetlands also include estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Furthermore, the wetlands ecosystem includes those areas which affect or are affected by the wetland itself, e.g., adjacent uplands or regions upstream and downstream. Areas covered with water for such a short time that there is no effect on moist soil vegetation are not included within the definition of wetlands nor are the permanent waters of streams, reservations and deep lakes.

A review of the USFWS’s National Wetlands Inventory (NWI) map for the Chesterfield County, Virginia area (USGS 7.5-minute quadrangle) indicates numerous areas of freshwater emergent and forested wetlands previously identified in the area of the airport. The NWI map is included as **Exhibit 5-6**. Note that NWI maps are designed for general planning purposes only and typically do not show all wetland resources within a given area.

A wetland survey and delineation was conducted by Mill Creek Environmental Consultants, Ltd. on existing airport property. The wetland delineation was performed according to the routine on-site criteria as outlined in the *Army Corps of Engineers Wetland Delineation Manual* (Technical Report Y-87-1) in conjunction with the 1992 Regulatory Guidance Letter to delineate the wetlands. Descriptions of the individual wetland areas may be found in the Wetland Delineation Report included in **Appendix G** of this report. Boundary of the survey area along with the wetland areas is illustrated on **Exhibit 5-7**. **The survey produced approximately 65 acres of wetlands, of which 98 percent are Palustrine, forested wetlands. The delineation also noted 6,241 linear feet of stream channels, the majority of which are manmade and serve as part of the stormwater management system of the airport. A preliminary Jurisdictional Determination (JD) was received from the Army Corps of Engineers (ACOE) on June 30,**



2011; copy is included in Appendix G.

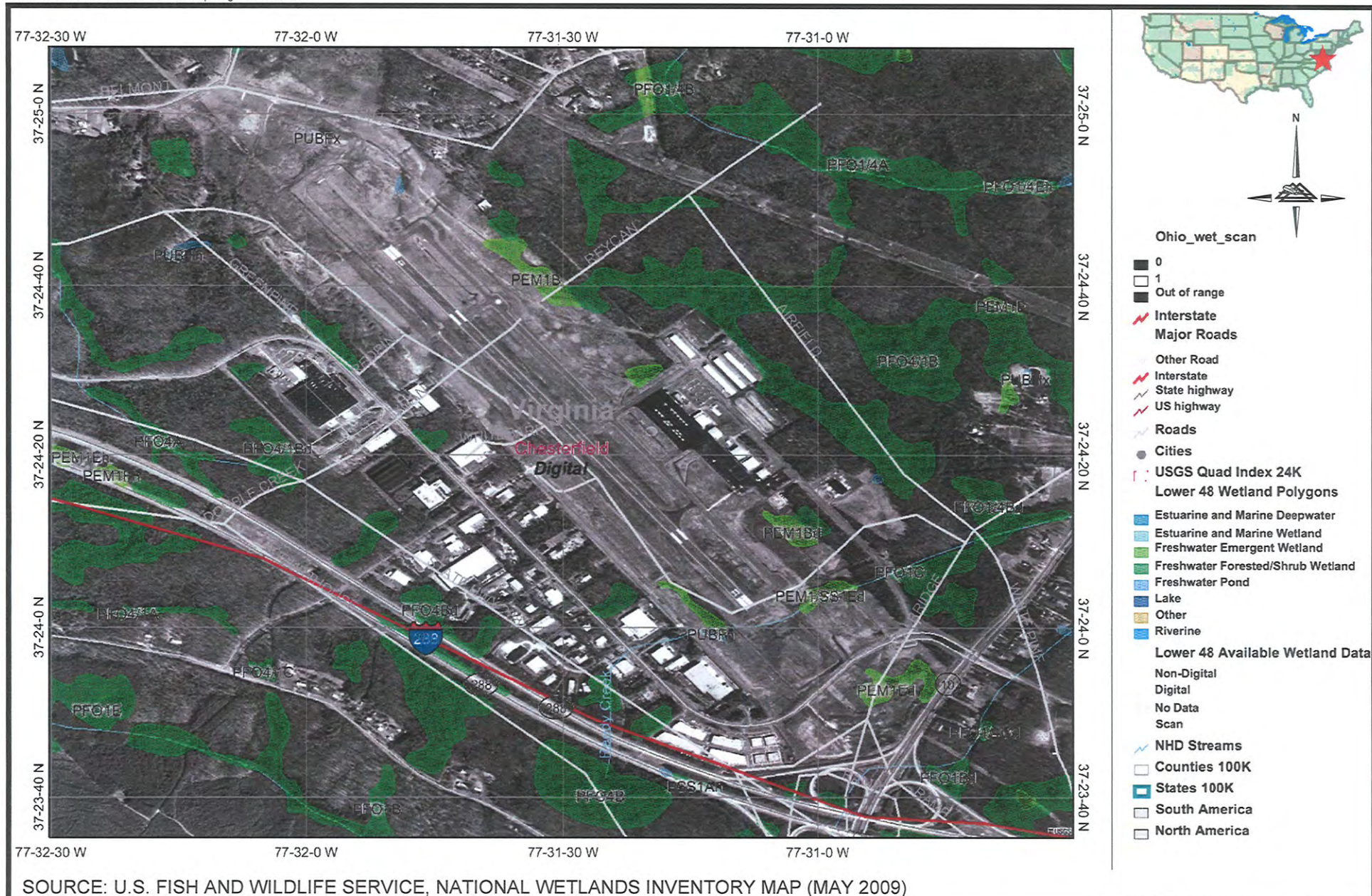
S. WILD AND SCENIC RIVERS

The Wild and Scenic River Act described those river areas eligible to be included in a system afforded protection under the act as free flowing and possessing "...outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values." There are no wild and scenic rivers in the Commonwealth of Virginia; the nearest designated river is the White Clay Creek located in southeastern Pennsylvania/northern Delaware. **This impact category is not applicable as there are no federally designated wild and scenic rivers located in the vicinity of the Chesterfield County Airport.**

T. CONCLUSION

An environmental inventory of airport property was conducted to document the airport's existing environmental conditions. In accordance with FAA Order 1050.1E, *Airport Environmental Handbook*, a brief examination of each of the impact categories was conducted. Environmental documentation as necessary will be conducted to fully determine potential impacts prior to any construction at FCI. The existing environmental information was taken into account during the preparation of the alternative chapter and was used to help determine the location of facilities in the analysis discussed in Chapter Six. Potential environmental impacts are summarized in Table 6-6.





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NATIONAL WETLAND INVENTORY MAP CHESTERFIELD COUNTY AIRPORT

DRAWN BY:

LKH

CHECKED BY:

KSK

SCALE:

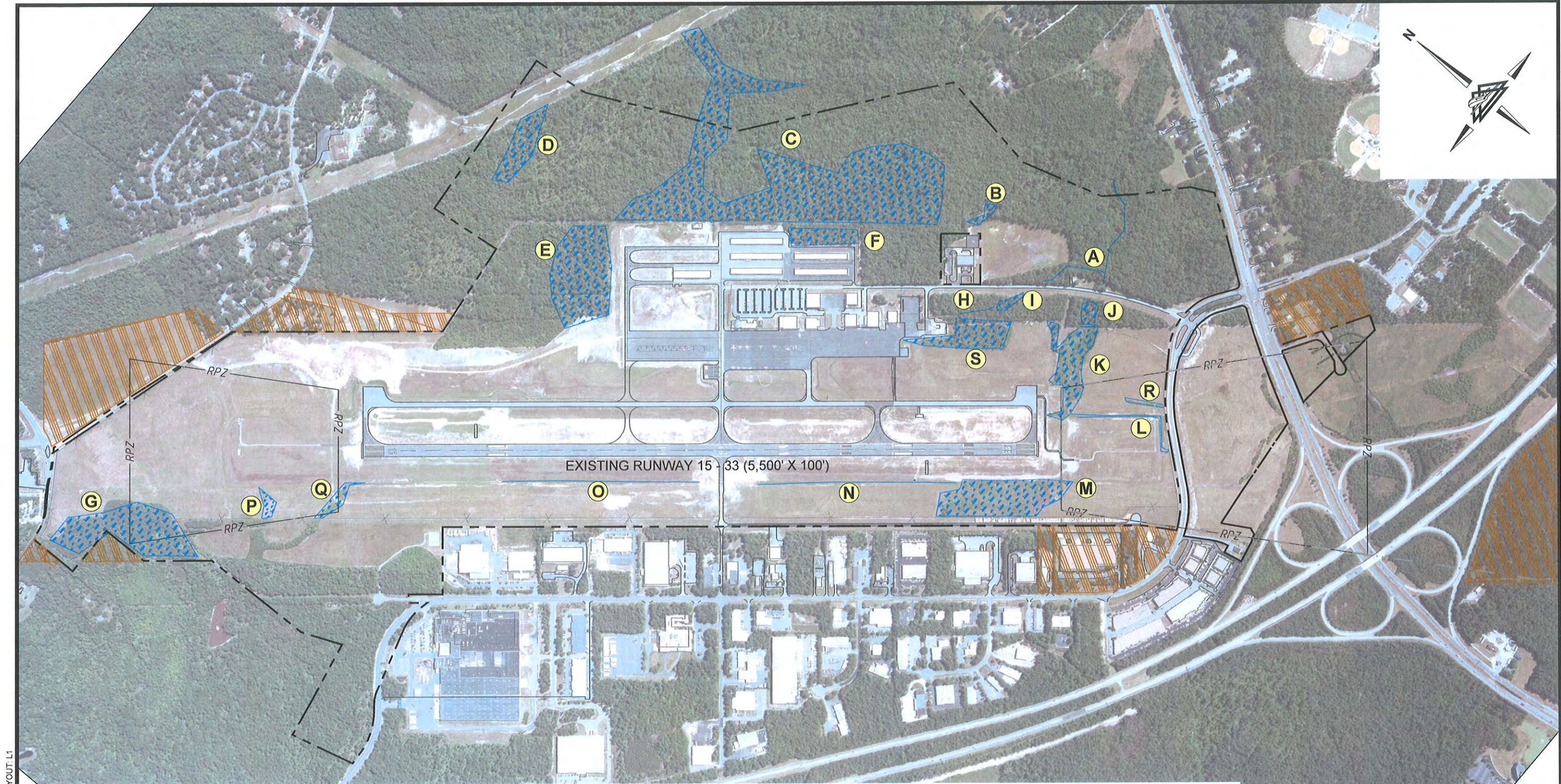
NTS

DATE:

OCTOBER 2010

EXHIBIT

5-6



LEGEND	
DESCRIPTION	EXISTING
AIRPORT PROPERTY LINE	---
RUNWAY PROTECTION ZONE (RPZ)	---RPZ---
AVIGATION EASEMENT	
WETLANDS	

SUMMARY OF MEASURED WETLANDS

A: 1,457 LF	I: 0.27 ACRES	Q: 0.72 ACRES
B: 0.31 ACRES	J: 0.47 ACRES	R: 264 LF
C: 31.31 ACRES	K: 3.45 ACRES	S: 2.76 ACRES
D: 2.63 ACRES	L: 1,003 LF	
E: 7.35 ACRES	M: 5.99 ACRES	
F: 1.72 ACRES	N: 1,637 LF	
G: 7.89 ACRES	O: 1,584 LF	
H: 296 LF	P: 0.41 ACRES	

SOURCE:

1. WETLAND AREA AND STREAM LENGTH CALCULATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009).



DELINEATED WETLANDS CHESTERFIELD COUNTY AIRPORT

EXHIBIT
5-7



A. INTRODUCTION

This chapter describes and evaluates the alternative plans leading to the selection of the recommended plan of development for the Chesterfield County Airport (FCI). The facility requirements of the airport to handle the forecast demand were discussed in Chapter Four. The overall objective of this chapter is to evaluate airport development concepts in a straight forward and logical manner. The alternatives provide Chesterfield County with a basis to plan airport development in the most safe and efficient manner. The evaluation of these alternative concepts considered facility requirements, aircraft operational needs, public access, and future development capability, with the intent of selecting a preferred operational alternative.

B. GOALS AND OBJECTIVES

The Master Plan Update effort began with discussions with the Master Plan Steering Committee and focused on the goals and objectives of FCI. The primary objective of such an effort must be to address any existing non-standard airfield conditions. The only existing non-standard conditions at FCI are the separation between Runway 15-33 and parallel Taxiway 'A' and the widths of Taxiways 'A', 'B', 'C', 'D', and 'E'. The standard taxiway width is 35 feet and currently all are 40 feet. FAA AC 150/5300-13 states that standard runway to parallel taxiway separation for an ARC C-II facility is 400 feet; however, the FAA approved a Modification of Airport Design Standards (MOS) on November 27, 2006 (see **Appendix H**) for the existing 375 feet non-standard separation. The FAA determined that the separation is adequate as long as the critical aircraft is no larger than a G-IV. A discussion of the challenges required to meet design standard separation is presented in the next section of this chapter. A layout depicting the parallel taxiway at standard 400 foot separation is discussed in Section C.

Following consideration of existing non-standard conditions, the evaluation of development alternatives must focus on the operational objectives of the airport's management and owners. Among these objectives were airfield operational enhancements to attract additional aeronautical



service providers, facility development plans to assist airfield maintenance efficiency and additional aircraft storage facilities to meet future demand. The key objectives are highlighted below.

- Obstruction Removal
- Construct Taxiway Turnout
- Establish Instrument Approach Procedure – RW 15 LPV
- Link Existing AWOS with the NADIN
- Replace Rotating Beacon
- Construct Large T-hangars
- Land Acquisition - RPZ control
- Auto Parking Pavement Rehabilitation
- Relocate Fuel Farm
- Airfield Pavement Maintenance
- Construct Conventional Hangars
- Extend Runway 15-33 & Parallel Taxiway
- Extend RSAs with Extension of Runway
- Construct Blast Pads with Extension of Runway
- Replace ARFF Vehicle
- Construct Alternative Fuel Site
- Replace SRE Building
- Acquire Class II Rotary Plow
- Acquire Displacement Plow, Sweeper, and Wheel Loader
- Construct Small T-hangars
- Install Approach Lighting System – RW 15

In addition, airport management desires to establish a location for potential development of the following:

- Pilot Activity Area
- Public Observation Park
- Aviation Education Facility



The County also sees the following items as potential key development objectives for long-range planning. These items will be depicted on the preferred development plan, but noted as projects for beyond the 20-year planning period.

- Parallel Runway
- Crosswind Runway
- Air Traffic Control Tower
- Construct Dual Taxilanes
- Construct Second Surface Access
- Construct Aircraft Parking Apron

Funding for each of the above listed projects is subject to eligibility under federal and state guidelines at such time the project is justified for development. Additional detail on current sources and eligibility of funding is highlighted in Chapter Eight, *Airport Capital Improvement Program*.

C. PARALLEL TAXIWAY ‘A’ SEPARATION ALTERNATIVES

1. Taxiway Alternative 1

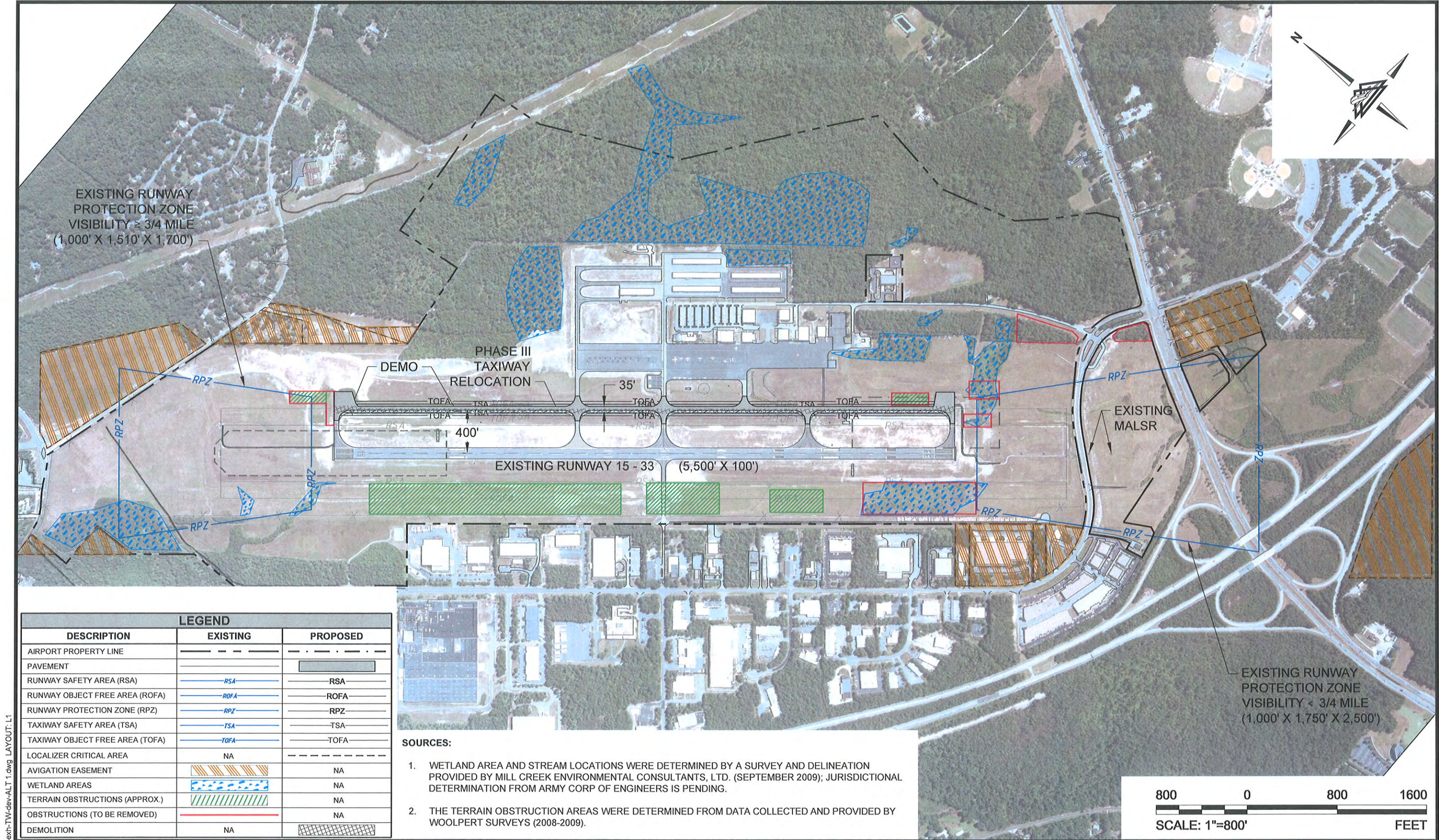
Taxiway Alternative 1 includes maintaining the existing non-standard separation of 375 feet as documented in the approved Modification of Standard (MOS). An evaluation of feasibility to achieve the design standard determined that the existing separation provides for a full runway safety area and taxiway safety area, plus sufficient space between the two for drainage inlets and ditches to remain outside the safety areas. In addition, the existing separation also maintains the runway obstacle free zone clear for the design aircraft with the highest tail height anticipated to use the taxiway. The Inner Transitional OFZ clear height over the taxiway is more than three times the tail height of the C-II aircraft (Gulfstream IV) with the highest tail height.



2. Taxiway Alternative 2

Taxiway Alternative 2 proposes to relocate the taxiway to 400 foot separation to achieve standard conditions. This alternative is depicted in **Exhibit 6-1**. The challenges associated with the relocation include demolition of the full-length parallel taxiway (5,500 feet x 35 feet) and relocation of the elevated edge lights. The most recent evaluation was conducted during 2006 in conjunction with preparations to rehabilitate Runway 15-33 and the parallel taxiway. Relocation of the taxiway to achieve standard was previously evaluated and determined to be feasible in terms of constructability, but cost prohibitive and thus, a Modification of Standard (MOS) was issued. Costs associated with the construction of Taxiway Alternative 2 are estimated at \$4 million.





LEGEND		
DESCRIPTION	EXISTING	PROPOSED
AIRPORT PROPERTY LINE	---	---
PAVEMENT		
RUNWAY SAFETY AREA (RSA)	—RSA—	—RSA—
RUNWAY OBJECT FREE AREA (ROFA)	—ROFA—	—ROFA—
RUNWAY PROTECTION ZONE (RPZ)	—RPZ—	—RPZ—
TAXIWAY SAFETY AREA (TSA)	—TSA—	—TSA—
TAXIWAY OBJECT FREE AREA (TOFA)	—TOFA—	—TOFA—
LOCALIZER CRITICAL AREA	NA	---
AVIGATION EASEMENT		NA
WETLAND AREAS		NA
TERRAIN OBSTRUCTIONS (APPROX.)		NA
OBSTRUCTIONS (TO BE REMOVED)		NA
DEMOLITION	NA	

- SOURCES:
1. WETLAND AREA AND STREAM LOCATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009); JURISDICTIONAL DETERMINATION FROM ARMY CORP OF ENGINEERS IS PENDING.
 2. THE TERRAIN OBSTRUCTION AREAS WERE DETERMINED FROM DATA COLLECTED AND PROVIDED BY WOOLPERT SURVEYS (2008-2009).

DRAWING: 06131-exh-TW-dev-ALT 1.dwg LAYOUT: L1



PARALLEL TAXIWAY RELOCATION
CHESTERFIELD COUNTY AIRPORT

DRAWN BY: LKH CHECKED BY: KSK SCALE: 1" = 800' DATE: OCTOBER 2010

EXHIBIT
6-1

D. COMMON ASPECTS OF ALL RUNWAY DEVELOPMENT ALTERNATIVES

As several of the development objectives and consultant recommendations are common to all build alternatives, they are presented in this section of the text, and omitted from repetitive presentation within each alternative. Although the need to extend Runway 15-33 is a common item among all alternatives, the approach to achieving the required length is varied and thus, the runway extension issues form the framework for evaluating the operational alternatives.

1. Obstruction Removal, Mitigation, and Prevention

Federal Aviation Regulations 14 CFR Part 77, Objects Affecting Navigable Airspace, establishes standards for determining obstructions in navigable airspace; sets forth the requirements for notice to the FAA Administrator of certain proposed construction or alteration; provides for aeronautical studies of obstructions to air navigation, to determine their effect on the safe and efficient use of airspace; provides for public hearings on the hazardous effect of proposed construction or alteration on air navigation; and provides for establishing antenna farm areas. Any existing fixed or mobile objects are, and future objects may be, obstructions to air navigation if they are of greater height than any of the heights or surfaces outlined in 14 CFR Part 77.23. The determination of whether an 'obstruction' is actually a 'hazard to air navigation' is accomplished through an aeronautical study conducted by the FAA. The standards apply to all objects, whether manufactured, objects of natural growth, or terrain.

FAA Advisory Circular (AC) 70/7460-1 provides information to persons proposing to erect or alter an object that may affect the navigable airspace. It explains the need to notify the FAA before construction begins and the FAA's response to such notice as required by 14 CFR Part 77. This requirement applies to activities on, and off, airport property, for distances including but not limited to, 20,000 feet from the nearest point of a runway. The airport owner/operator has the responsibility to ensure the aerial approaches to the airfield are adequately cleared and protected.



Existing obstruction data for FCI is based on an aerial survey conducted by Woolpert, Inc. during the fall of 2008. An analysis of the survey data identified terrain, natural growth, and man-made objects that exist on and off airport property and penetrate the 14 CFR Part 77 surfaces. Penetrations to the transitional surface on the west side of Runway 15-33 includes the terrain over a buried gas pipeline installed prior to airport construction. Easement for the pipeline was acquired in 1956 and stated that the utility company has authority under the easement to maintain the pipeline and install additional pipe at their discretion. An inquiry was made as to the cost to lower or relocate the pipeline. Columbia Gas Transmission Company advised that the requested analysis would require a proposed project plan and an engineering contract with Columbia Gas requiring the proponent to pay for the analysis (**Appendix J**). It is recommended that obstruction lighting be installed along the pipeline easement as depicted on the current approved ALP. **Details of the obstruction data collected are presented in the Airport Layout Plan (ALP) drawing set contained and described in Chapter Seven of this report.**

It is recommended that FCI management remove on-airport obstructions as soon as possible, maintain existing mitigation measures (obstruction lighting) for specific off airport obstructions, and negotiate with the appropriate property owners to mitigate remaining off airport obstructions. Obstruction removal is one of three actions required to be taken to lower instrument approach minimums. The Code of Chesterfield County, Virginia, §19-507 contains an ordinance which establishes an airport overlay zone with height exemptions and limitations to protect 14 CFR Part 77 surfaces.

2. Acquisition of Controlling Interest in RPZs

Runway Protection Zones (RPZs) are areas off the runway end to enhance the protection of people and property on the ground. This function is achieved through airport owner control over the RPZ areas. Such control includes the clearing and maintenance of incompatible objects and activities. While the FAA prefers that all objects be cleared from the RPZ, some uses are permitted, provided they do not attract wildlife. Land uses



prohibited from the RPZ include residences and places of public assembly, as well as fuel storage facilities (Ref: FAA AC 150/5300-13, Paragraph 212).

Existing land survey information indicates that FCI does not currently control all property within the RPZ areas. Fee simple acquisition is the preferred method of control, and is recommended. FAA AC 150/5300-13, Chapter 2, provides specific recommendations related to compatible land use within an RPZ. While the FAA prefers that the airport own all of the land within the RPZs, a combination of fee simple land acquisition and avigation easement is recommended for control of the Runway 33 RPZ as the intersection of two major public roadways (Route 288 and Ironbridge Road) occupy much of the area. Estimated acreage and future acquisition needs for RPZ areas at FCI are provided with each Runway Development Alternative.

Both Alternatives 3 and 4 propose to reduce visibility to less than $\frac{3}{4}$ mile which would shift the RPZ to the north with the proposed extension, and increase the size of the RPZ from its current dimensions. The larger RPZ would result in the acquisition of a church and two residences on Belmont Road.

3. Establish Instrument Approach Procedure

There is currently an RNAV (GPS) instrument approach to Runway 15 with established LNAV minima of 680 MSL and one mile visibility. As detailed in Chapter Four, the ongoing NAVAID study being prepared under direction of the Virginia Department of Aviation (DOAV) includes consideration of reducing LPV minima to less than one mile for the existing RNAV (GPS). Reduction of visibility to less than three-quarter mile with installation of a Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) is presented in Alternatives 3 and 4. No additional instrument approach procedures are under consideration for Runway 33 at this time.



4. Airfield Pavement Maintenance

Chapter Four recommends the runway be maintained in accordance with the airport's pavement maintenance plan throughout the planning period. This maintenance plan would be implemented regardless of the development alternative selected.

E. RUNWAY DEVELOPMENT ALTERNATIVES

The runway development alternatives considered during this evaluation phase are to reflect the concepts deemed feasible to meet the facility requirements necessary to accommodate existing and forecasted demand as summarized in Chapter Four. Estimated project costs are summarized within each alternative description and detailed in Chapter Eight of this report.

The four alternatives presented include a no action alternative, an alternative to address the minimum action required to achieve FAA design standards, and two build concepts. The build alternatives propose a 6,300 foot runway length (800 foot extension) for Runway 15-33.

Potential environmental impacts have been highlighted for each alternative in **Table 6-4** following this section. Qualitative and quantitative comparison matrices of each runway alternative are presented in **Tables 6-5** and **6-6**.

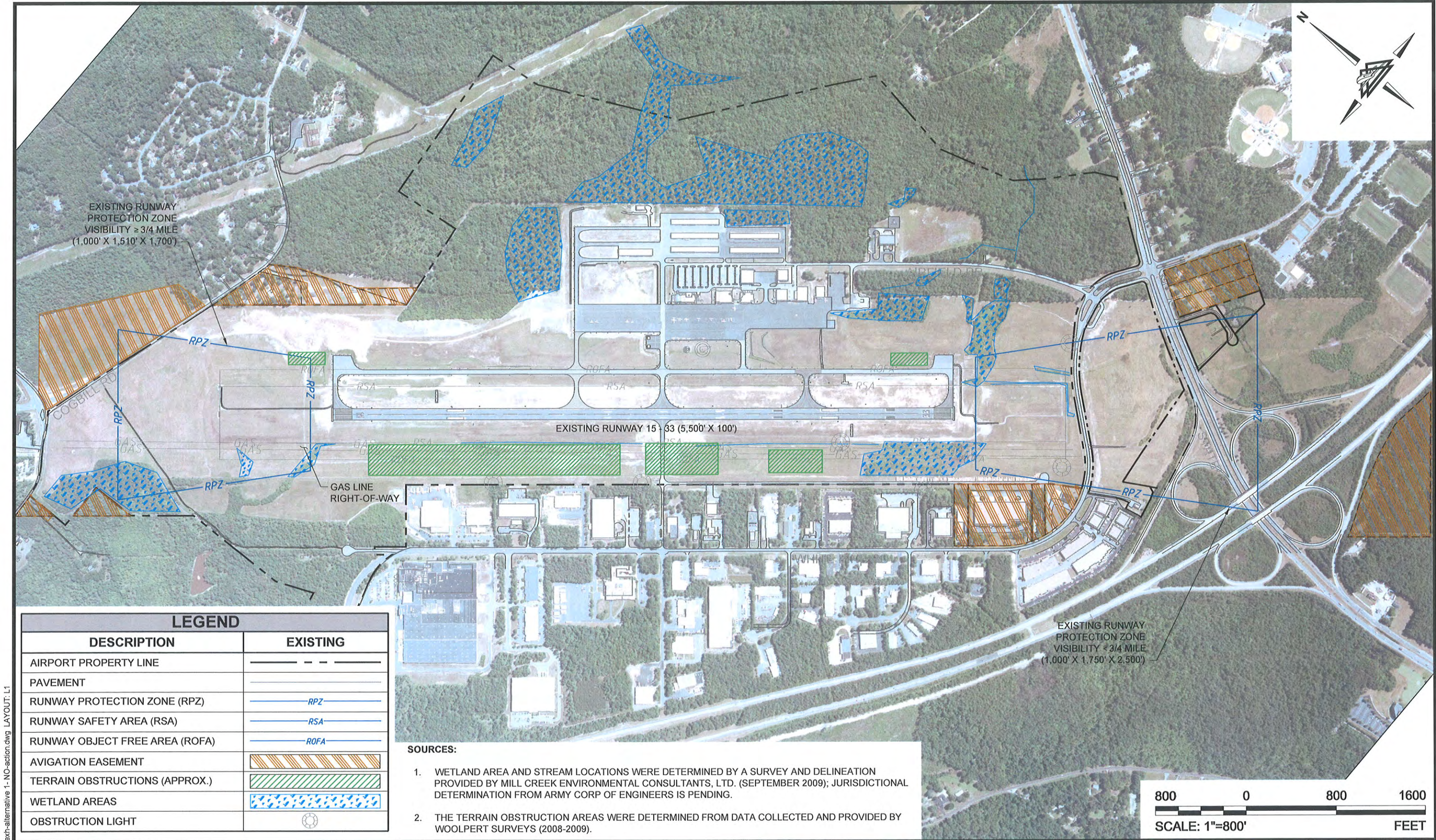
1. Runway Development – Alternative 1 – No Action

The No Action alternative serves as a basis of comparison for the other potential alternatives. Under the No Action alternative, the airport would remain as it exists today and existing facilities would be maintained, however, no additional development would occur. Alternative 1 – No Action is depicted in **Exhibit 6-2**.

Advantages:

- Least cost alternative.





DRAWING: 06131-exh-alternative 1- NO action.dwg LAYOUT: L1



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RUNWAY DEVELOPMENT - ALTERNATIVE 1 - NO ACTION CHESTERFIELD COUNTY AIRPORT

DRAWN BY: LKH CHECKED BY: KSK SCALE: 1" = 800' DATE: OCTOBER 2010

EXHIBIT
6-2

Disadvantages:

- Does not meet FAA design standards.
- Does not achieve the recommended runway length of 6,300 feet.
- Does not provide control of existing RPZs.
- Does not mitigate existing obstructions.

2. Runway Development – Alternative 2 – Achieve Standards

Under the Achieve Standards Alternative, no runway extension would occur; however the existing parallel taxiway would be relocated to 400 foot separation at a width of 35 feet to achieve standard conditions and the glideslope would be relocated outside the Runway Object Free Area. Taxiways 'B', 'C', 'D' and 'E' would be reduced to 35 feet in width to meet standard. Specific actions to achieve compliance with 14 CFR Part 77 and control of RPZs would be undertaken including appropriate environmental analysis, land acquisition, and obstruction removal. Alternative 2 would require an estimated 16 acres of aviation easement acquisition within the Runway 33 RPZ and 15 acres of fee simple acquisition¹ (two acres within the Runway 15 RPZ and 13 acres within the Runway 33 RPZ) to achieve the recommended RPZ control. This alternative would also remove existing natural growth obstructions.

As existing obstructions are located within delineated wetland areas, approximately eight acres of wetland impacts could occur with the implementation of Runway Development Alternative 2. Cost estimation for this alternative assumes the obstructions within wetland areas would be cleared and grubbed.

The alternative can be developed at an estimated cost of \$6.4 million, see **Table 6-1** for details. **Exhibit 6-3** illustrates this alternative.

¹ 13 acres of fee simple acquisition and 16 acres of aviation easement shown within the Runway 33 RPZ would be transferred from the County to a dedicated airport designation or subjected to the appropriate land use restrictions.



Advantages:

- Meets FAA design standards.
- Airport gains control over RPZs.
- Natural growth obstructions removed to enhance operational safety.
- Minimal land acquisition required.

Disadvantages:

- Does not achieve the recommended runway length of 6,300 feet.
- Approximately eight acres of wetland impacts due to existing obstruction removal².
- Requires lighting for terrain obstructions (earthen mound covering gas pipeline).

Table 6-1
Chesterfield County Airport
Runway Alternative 2 Estimated Costs

NO.	PROJECT	ESTIMATED COSTS
1	Environmental Assessment	\$200,000
2	Land Acquisition ¹	\$115,000
3	Obstruction Removal ²	\$200,000
4	Install Obstruction Lights	\$20,000
5	Wetland Mitigation ³	\$1,600,000
6	Taxiway Relocation ^{4, 5}	\$4,000,000
7	Relocate Glideslope ⁶	\$300,000
ESTIMATED TOTAL ALTERNATIVE 2		\$6,435,000

Note: ¹Land costs estimated based on current (2010) Chesterfield County Real Estate Tax Assessments and includes land services. Land costs are conservative estimates and may be reduced if County and VDOT fee/easements are transferred at no cost.

²Removal of existing terrain and tree penetrations within designated areas. Tree removal areas include wetland areas.

³Wetland mitigation estimated using a 2:1 mitigation ratio at \$100,000 per acre for purchase of mitigation credits through the Nature Conservancy (per coordination with ACOE and Mill Creek Environmental Consultants, Ltd. - May 2010).

⁴Estimated cost includes grading, drainage, pavement and marking, and electrical, plus estimated engineering fees and administration costs, and contingency.

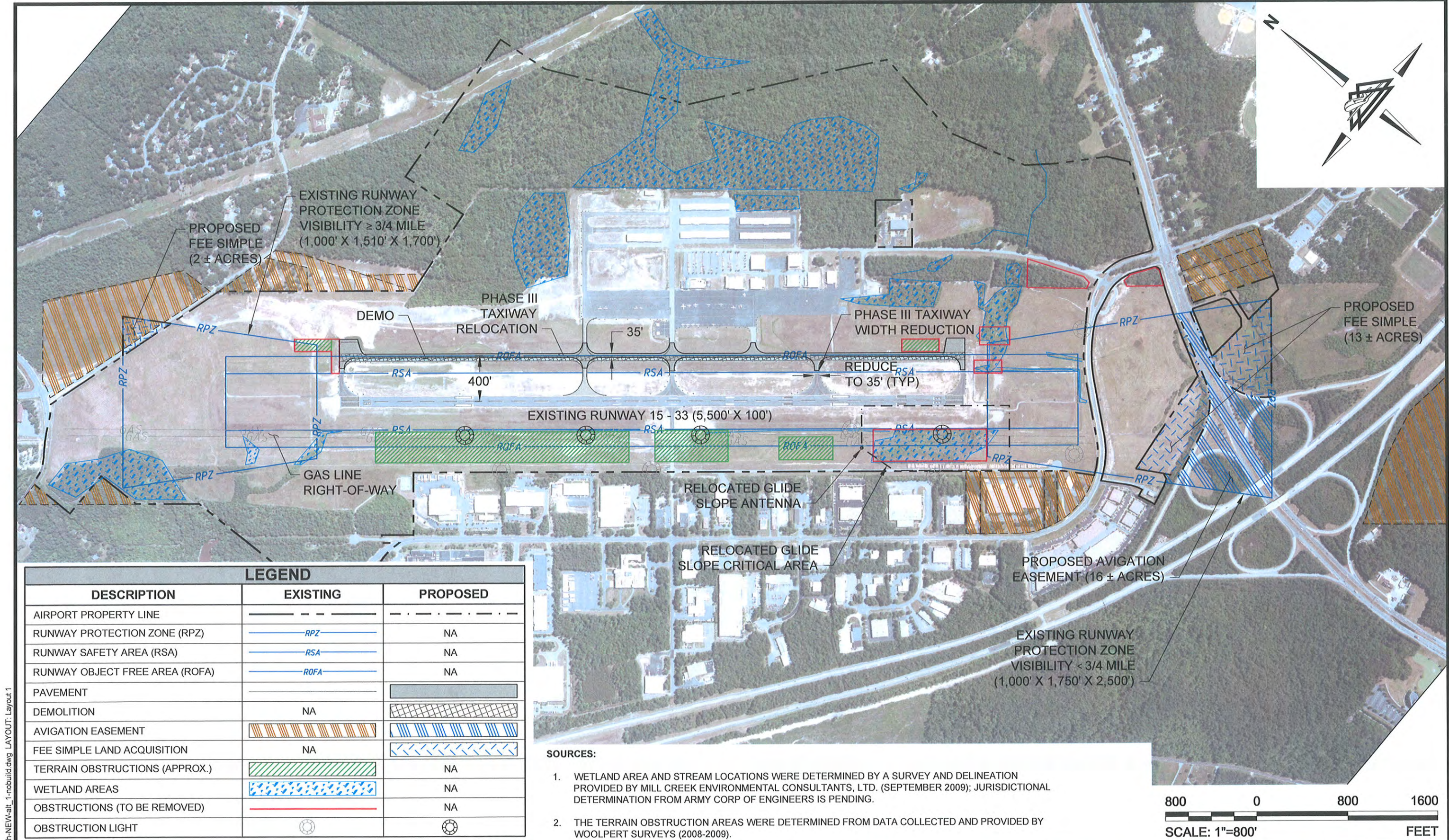
⁵Cost includes reduction in width of Taxiways 'B', 'C', 'D' and 'E' to 35'.

⁶Relocation per FAA-WADO and DOAV Request.

Source: Delta Airport Consultants, Inc.

² As grading limits have not been defined, wetland impacts are calculated based upon estimated areas of disturbance. Impacts to wetlands would be refined during the required NEPA process prior to construction.





LEGEND		
DESCRIPTION	EXISTING	PROPOSED
AIRPORT PROPERTY LINE	---	---
RUNWAY PROTECTION ZONE (RPZ)	RPZ	NA
RUNWAY SAFETY AREA (RSA)	RSA	NA
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	NA
PAVEMENT		
DEMOLITION	NA	
AVIGATION EASEMENT		
FEE SIMPLE LAND ACQUISITION	NA	
TERRAIN OBSTRUCTIONS (APPROX.)		NA
WETLAND AREAS		NA
OBSTRUCTIONS (TO BE REMOVED)		NA
OBSTRUCTION LIGHT		

- SOURCES:
1. WETLAND AREA AND STREAM LOCATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009); JURISDICTIONAL DETERMINATION FROM ARMY CORP OF ENGINEERS IS PENDING.
 2. THE TERRAIN OBSTRUCTION AREAS WERE DETERMINED FROM DATA COLLECTED AND PROVIDED BY WOOLPERT SURVEYS (2008-2009).

RUNWAY DEVELOPMENT - ALTERNATIVE 2 - ACHIEVE STANDARDS
CHESTERFIELD COUNTY AIRPORT

DRAWN BY: LKH CHECKED BY: CMA SCALE: 1" = 800' DATE: OCTOBER 2010

3. Runway Development - Alternative 3

Alternative 3 proposes to extend Runway 15-33 and the associated parallel taxiway 800 feet to the north to provide the recommended 6,300 feet of runway length. This alternative would incorporate the Alternative 2 project elements to achieve standards. The project would require relocation of the existing Runway 15 threshold lighting, existing 4-box Precision Approach Path Indicators (PAPIs), and the existing localizer, as well as demolition of the existing holding bay.

Blast pads would also be constructed at each runway end to mitigate erosion due to forecasted increase in jet traffic.

Lastly, the power lines along Cogbill Road would require relocation underground as they would become obstructions to the Runway 15 approach surface.

An evaluation of the feasibility to reduce Runway 15 instrument approach minimums was conducted. The key element in determining the feasibility of reducing approach minimums to lower than $\frac{3}{4}$ mile for Runway 15 is the larger RPZ size. A total of 44 acres of fee simple acquisition would be required for the larger Runway 15 RPZ and three acres of avigation easement for obstruction removal. An Approach Lighting System (ALS) is also required to reduce the visibility and a Medium-intensity Approach Lighting System with Runway alignment indicator lights (MALSR) is recommended. The Fairhavens Church as well as two residential properties would be included in this acquisition and relocation to accommodate the RPZ. The Runway 33 RPZ would require approximately 16 acres of easement and 13 acres of fee simple acquisition³.

Approximately three additional acres of wetland impacts are associated with the construction of this alternative beyond the eight acres noted in Alternative 2, Achieve Standards. Although delineated wetlands are located outside of the RSA and the

³ 13 acres of fee simple acquisition and 16 acres of avigation easement shown within the Runway 33 RPZ would be transferred from the County to a dedicated airport designation or subjected to the appropriate land use restrictions.



proposed extension area, grading as well as existing and proposed obstruction removal would be required in wetland areas.

The alternative can be developed at an estimated cost of \$9.3 million, see **Table 6-2** for details. **Exhibit 6-4** illustrates this alternative.

Advantages:

- Natural growth obstructions removed to enhance operational safety.
- Control over RPZs achieved.
- Runway length increased to 6,300 feet.
- Reduced visibility approach ($< \frac{3}{4}$ mile) on Runway 15 when increased RPZ dimensions combined with obstruction removal and installation of ALS.

Disadvantages:

- Power lines along Cogbill Road would need to be relocated underground.
- Runway 15 RPZ extends over the Fairhavens Independent Methodist Church requiring acquisition and relocation.
- RPZ control needs also require the acquisition and relocation of two private residences.
- Approximately three acres of additional wetland impacts due to obstruction removal and grading⁴ beyond the eight acres impacted in Alternative 2, Achieve Standards.
- Requires relocation of PAPI and localizer.

⁴ As grading limits have not been defined, wetland impacts are calculated based upon estimated areas of disturbance. Impacts to wetlands would be refined during the required NEPA process prior to construction.



Table 6-2
Chesterfield County Airport
Runway Alternative 3 Estimated Costs

NO.	PROJECT	ESTIMATED COSTS
1	Environmental Assessment	\$630,000
2	Land Acquisition ¹	\$3,000,000
3	Obstruction Removal ²	\$150,000
4	Wetland Mitigation ³	\$600,000
5	Relocate Power Lines Underground	\$250,000
6	Relocate Localizer	\$200,000
7	Relocate PAPI	\$70,000
8	Runway Extension (including safety area) ⁴	\$3,500,000
9	Construct Blast Pads	\$400,000
10	Install MALSR	\$500,000
ESTIMATED TOTAL ALTERNATIVE 3		\$9,300,000
ESTIMATED TOTAL TO ACHIEVE STANDARDS (excluding Environmental Assessment)		\$6,235,000
TOTAL		\$15,535,000

Note: ¹Land costs estimated based on current (2010) Chesterfield County Real Estate Tax Assessments plus an estimated \$1 million for relocation of church and residences; includes land services.

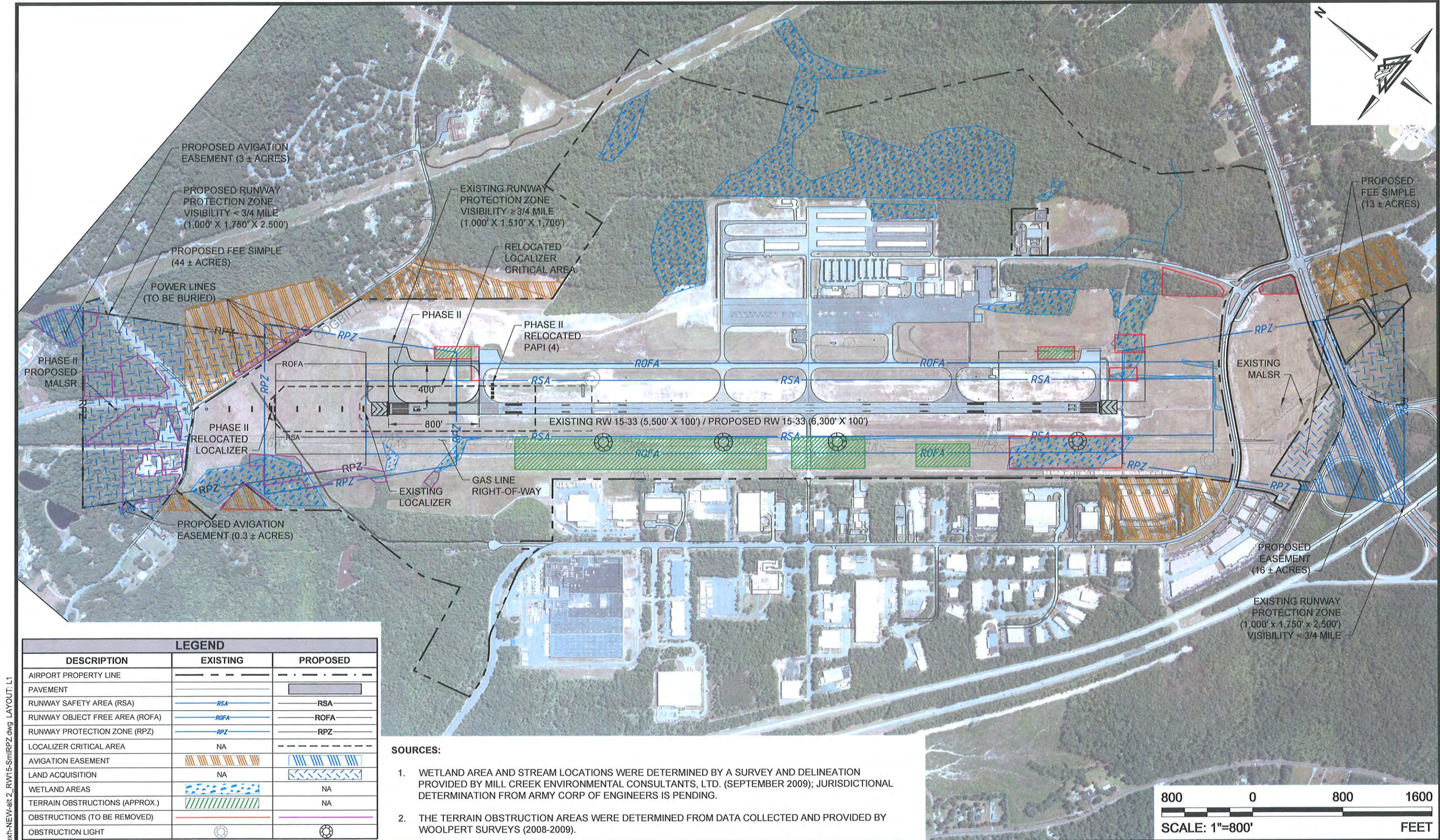
²Removal of proposed tree penetrations within designated areas. Tree removal areas include wetland areas.

³Wetland mitigation estimated using a 2:1 mitigation ratio at \$100,000 per acre for purchase of mitigation credits through the Nature Conservancy (per coordination with ACOE and Mill Creek Environmental Consultants, Ltd. - May 2010).

⁴Estimated cost for runway extension includes grading, drainage, pavement and marking, electrical, and relocation of associated navigational aids, plus estimated engineering fees and administration costs, and contingency.

Source: Delta Airport Consultants, Inc.





LEGEND		
DESCRIPTION	EXISTING	PROPOSED
AIRPORT PROPERTY LINE	---	---
PAVEMENT		
RUNWAY SAFETY AREA (RSA)	—RSA—	RSA
RUNWAY OBJECT FREE AREA (ROFA)	—ROFA—	ROFA
RUNWAY PROTECTION ZONE (RPZ)	—RPZ—	RPZ
LOCALIZER CRITICAL AREA	NA	---
AVIGATION EASEMENT		
LAND ACQUISITION	NA	
WETLAND AREAS		NA
TERRAIN OBSTRUCTIONS (APPROX.)		NA
OBSTRUCTIONS (TO BE REMOVED)		
OBSTRUCTION LIGHT		

SOURCES:

1. WETLAND AREA AND STREAM LOCATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009); JURISDICTIONAL DETERMINATION FROM ARMY CORP OF ENGINEERS IS PENDING.
2. THE TERRAIN OBSTRUCTION AREAS WERE DETERMINED FROM DATA COLLECTED AND PROVIDED BY WOOLPERT SURVEYS (2008-2009).



RUNWAY DEVELOPMENT - ALTERNATIVE 3 (6,300')
CHESTERFIELD COUNTY AIRPORT

EXHIBIT
6-4

4. Runway Development – Alternative 4

Alternative 4 proposes to extend Runway 15-33 and the associated parallel taxiway 600 feet to the north and 200 feet to the south, to provide the recommended 6,300 feet of runway length. This alternative would incorporate the Alternative 2 project elements to achieve standards. The project would require relocation of the existing Runway 15 threshold lighting, existing 4-box Precision Approach Path Indicators (PAPIs) at each end of the runway, the existing localizer as well as demolition of the existing holding bay. Blast pads at each runway end would also be included to mitigate erosion due to the forecasted increase in jet traffic. In addition, the FAA has requested that the glide slope equipment be relocated outside the limits of the ROFA.

Stormwater from the Industrial Park, located adjacent to FCI to the west, flows across airport property to a drainage basin located east of the Runway 33 end. Extending Runway 33 would require extensive drainage reconstruction, thus increasing environmental concerns and the cost associated with the proposed extension project.

In addition, the power lines along Cogbill Road would require relocation underground as they would become obstructions to the Runway 15 approach surface.

To the south, this alternative would also require the relocation of Whitepine Road to maintain clearance of the proposed ROFA and RSA, and to provide adequate vertical clearance over the road for the 14 CFR Part 77 Approach Surface. As discussed in the March 16, 2010 Steering Committee meeting (**Appendix I**), the 200 foot extension would create a penetration (Route 288) to the 50:1 approach surface which would require approval by the FAA and completion of an aeronautical study. At minimum, additional obstruction lights would be required to alert pilots of the roadway overpass.

As noted in Alternative 3, an evaluation of the feasibility to reduce Runway 15 instrument approach minimums to lower than $\frac{3}{4}$ mile was conducted. The larger RPZ size creates similar land requirements as was the case with Alternative 3. A total of 37



acres of fee simple acquisition would be required for the larger Runway 15 RPZ. The installation of the MALSR is recommended as in Alternative 3, and acquisition and relocation of the Fairhavens Church and two residential properties remain a requirement in this build alternative to achieve land use control of the associated RPZ. Approximately 19 acres of avigation easement would be required over the roads and intersection and 17 acres of fee simple acquisition⁵ would be required for the remaining areas within the Runway 33 RPZ.

Approximately four acres of additional wetland impacts are associated with the construction of this alternative beyond the eight acres from Alternative 2, Achieve Standards. Although delineated wetlands are located outside of the RSA and the proposed extension area, impacts would be caused due to grading and obstruction removal within wetland areas.

The alternative can be developed at an estimated cost of \$12.1 million, see **Table 6-3** for details. **Exhibit 6-5** illustrates this alternative.

Advantages:

- Natural growth obstructions removed to enhance operational safety.
- Airport gains control over RPZs.
- Runway length increased to 6,300 feet.
- Reduced visibility approach (< ¾ mile) on Runway 15 with increased RPZ dimensions

Disadvantages:

- Requires the relocation of Whitepine Road.
- Requires significant drainage reconstruction.
- 50:1 Approach surface penetration requires FAA approval.
- Requires relocation of PAPI and localizer.

⁵ 17 acres of fee simple acquisition and 19 acres of avigation easement shown within the Runway 33 RPZ would be transferred from the County to a dedicated airport designation or subjected to the appropriate land use restrictions.



- Power lines along Cogbill Road would need to be relocated underground.
- Runway 15 RPZ extends over the Fairhavens Independent Methodist Church requiring acquisition and relocation.
- RPZ control needs also require acquisition and relocation of two private residences.
- Approximately four acres of additional wetland impacts⁶ beyond the eight acres noted in Alternative 2, Achieve Standards, due to obstruction removal and grading associated with extending Runways 15 and 33.

Table 6-3
Chesterfield County Airport
Runway Alternative 4 Estimated Costs

NO.	PROJECT	ESTIMATED COSTS
1	Environmental Assessment	\$630,000
2	Land Acquisition ¹	\$3,000,000
3	Obstruction Removal ²	\$60,000
4	Wetland Mitigation ³	\$800,000
5	Road Relocation (Whitepine Road)	\$1,500,000
6	Relocate Power Lines Underground	\$250,000
7	Relocate Localizer	\$200,000
8	Relocate PAPI	\$140,000
9	Runway Extension (including safety area) ⁴	\$4,600,000
10	Construct Blast Pads	\$400,000
11	Install MALSR	\$500,000
ESTIMATED TOTAL ALTERNATIVE 4		\$ 12,080,000
ESTIMATED TOTAL TO ACHIEVE STANDARDS (excluding Environmental Assessment)		\$6,235,000
TOTAL		\$18,315,000

Note: ¹Land costs estimated based on current (2010) Chesterfield County Real Estate Tax Assessments plus an estimated \$1 million for relocation of church and residences; includes land services.

²Removal of proposed tree penetrations within designated areas. Tree removal areas include wetland areas.

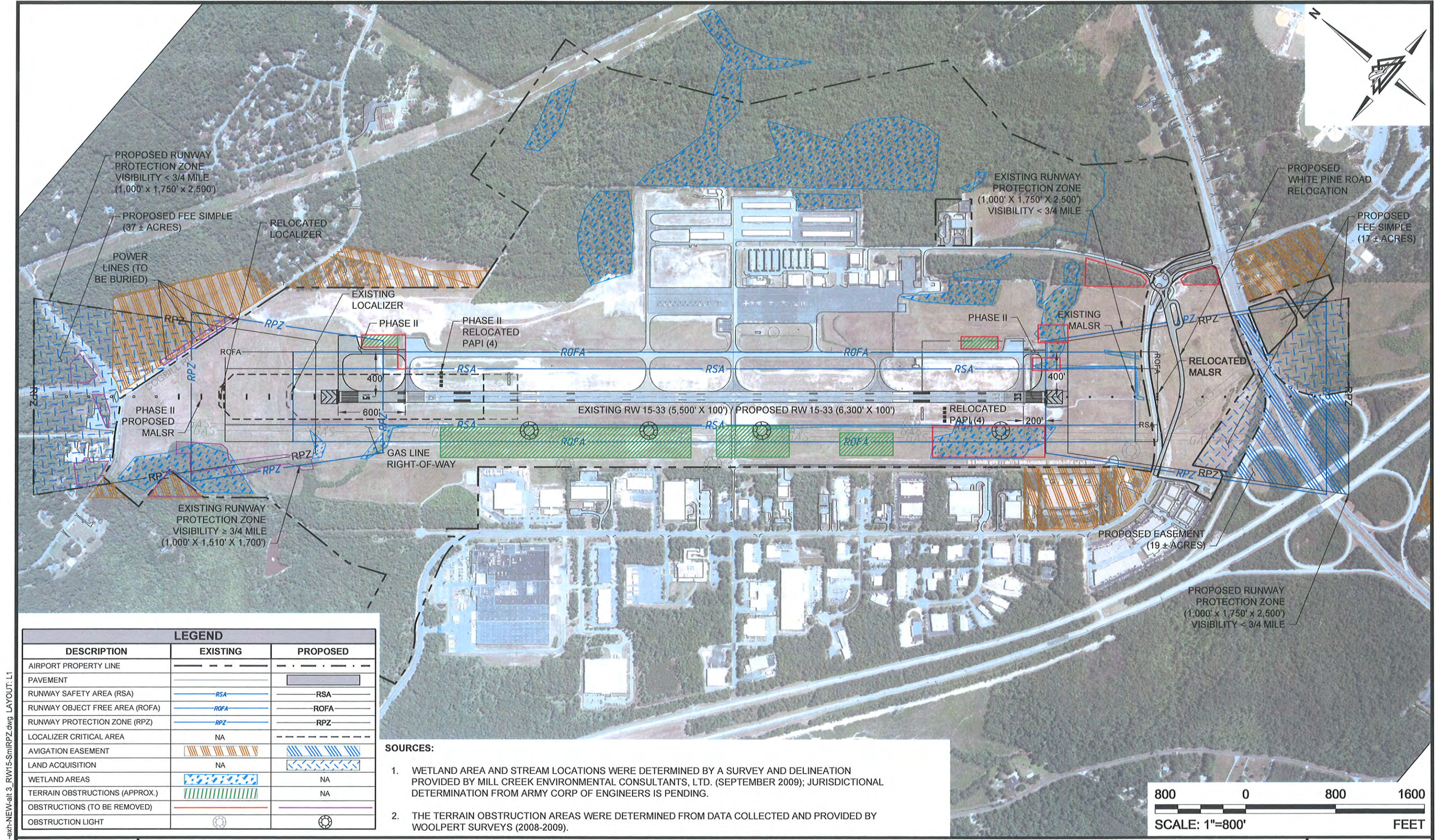
³Wetland mitigation estimated using a 2:1 mitigation ratio at \$100,000 per acre for purchase of mitigation credits through the Nature Conservancy (per coordination with ACOE and Mill Creek Environmental Consultants, Ltd. - May 2010).

⁴Estimated cost for runway extension includes grading, drainage, pavement and marking, electrical, and relocation of associated navigational aids, plus estimated engineering fees and administration costs, and contingency.

Source: Delta Airport Consultants, Inc.

⁶ As grading limits have not been defined, wetland impacts are calculated based upon estimated areas of disturbance. Impacts to wetlands would be refined during the required NEPA process prior to construction.





LEGEND		
DESCRIPTION	EXISTING	PROPOSED
AIRPORT PROPERTY LINE	---	---
PAVEMENT		
RUNWAY SAFETY AREA (RSA)	—RSA—	RSA
RUNWAY OBJECT FREE AREA (ROFA)	—ROFA—	ROFA
RUNWAY PROTECTION ZONE (RPZ)	—RPZ—	RPZ
LOCALIZER CRITICAL AREA	NA	---
AVIGATION EASEMENT		
LAND ACQUISITION	NA	
WETLAND AREAS		NA
TERRAIN OBSTRUCTIONS (APPROX.)		NA
OBSTRUCTIONS (TO BE REMOVED)	---	---
OBSTRUCTION LIGHT	⊙	⊙

- SOURCES:**
1. WETLAND AREA AND STREAM LOCATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009); JURISDICTIONAL DETERMINATION FROM ARMY CORP OF ENGINEERS IS PENDING.
 2. THE TERRAIN OBSTRUCTION AREAS WERE DETERMINED FROM DATA COLLECTED AND PROVIDED BY WOOLPERT SURVEYS (2008-2009).



RUNWAY DEVELOPMENT - ALTERNATIVE 4 (6,300') CHESTERFIELD COUNTY AIRPORT

EXHIBIT
6-5

DRAWING: 06131-ext-NEW-alt 3_RW15-33mRPZ.dwg LAYOUT: L1



DRAWN BY: LKH CHECKED BY: KSK SCALE: 1" = 800' DATE: OCTOBER 2010

Table 6-4
Chesterfield County Airport
Comparison of Environmental Consequences for Runway Development Alternatives¹

Impact Category	Alternatives			
	1 – No Action	2 – Achieve Standards	3	4
Air Quality	No	No	No	No
Coastal Resources	No	No	No	No
Compatible Land Use	Yes – land acquisition	Yes – land acquisition	Yes – land acquisition	Yes – land acquisition
Construction Impacts	No	Unknown	Unknown	Unknown
Department of Transportation 4(f)	No	Unknown	Unknown	Unknown
Farmlands	No	No	No	No
Fish, Wildlife, and Plants	Yes – tree removal	Yes – tree removal	Yes – tree removal	Yes – tree removal
Floodplains	No	No	No	No
Hazardous Materials, Pollution Prevention, and Solid Waste	No	No	No	No
Historic, Architectural, Archaeological, and Cultural Resources	No	Unknown	Unknown	Unknown
Light Emissions and Visual Impacts	No	No	No	No
Natural Resources, Energy Supply, and Sustainable Design	No	No	No	No
Noise	No	No	Unknown	Unknown
Secondary (Induced) Impacts	No	No	No	No
Socioeconomic Impacts, Environmental Justice, and Children’s Environmental Health and Safety Risks	No	No	No	Yes – road relocation
Water Quality	No	No	No	No
Wetlands	No	Yes	Yes	Yes
Wild and Scenic Rivers	No	No	No	No

Note: ¹Impact evaluation based upon existing information only for airport property. An Environmental Assessment will be completed to evaluate impact categories in detail.

Source: Delta Airport Consultants, Inc. Analysis



Table 6-5
Chesterfield County Airport
Qualitative Runway Evaluation Matrix

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Operational Objectives				
Achieves Recommended Runway Length	No	No	Yes	Yes
Enhances All Weather Capability	No	No	Yes	Yes
Achieves FAA Design Criteria	No	Yes	Yes	Requires special consideration be given for Part 77 penetrations over Route 288.
Environmental Considerations				
Land Requirements (acres)				
Runway 15	None	2 ± (Fee)	44 ± (Fee); 3± (Easement)	37± (Fee)
Runway 33	None	13 ± (Fee); 16 ± (Easement)	13 ± (Fee); 16 ± (Easement)	17 ± (Fee); 19 ± (Easement)
Relocation Impacts	None	None	1 Church; 2 Residences	1 Church; 2 Residences
Obstruction Removal	None	Approximately 14 acres.	Approximately 34 acres. ¹	Approximately 22 acres. ¹
Wetland Impacts	None	Approximately 8 acres.	Approximately 11 acres. ¹	Approximately 12 acres. ¹
Constructability				
Road Realignment	None	None	None	Whitepine Road must be realigned outside RSA/ROFA.
Phasing	None	Only Runway 15 end involved.	Only Runway 15 end involved.	Involves construction at both ends of the runway.
Utilities Impacts	None	None	Bury overhead power lines along Cogbill Road.	Utility relocation associated with road realignment. Bury overhead power lines along Cogbill Road.
14 CFR Part 77 Compliance	Not compliant obstructions exist	Compliant with removal of existing obstructions.	Avigation easement offset with fee simple requirements.	Creates additional surface penetrations over Route 288.
Cost				
Project Cost	\$0	\$6.4 million	\$15.5 million ²	\$18.3 million ²

Note: ¹ Includes impacts associated with Alternative 2, Achieve Standards.

²Includes costs to achieve standards.

Source: Delta Airport Consultants, Inc.



The ability of each runway alternative to satisfy evaluation criteria in Tables 6-5 and 6-6 was developed on a scale of 1 to 3 with 1 representing an alternative that has the least ability to satisfy particular evaluation criteria and 3 the highest ability to satisfy particular evaluation criteria.

Table 6-6
Chesterfield County Airport
Quantitative Runway Evaluation Matrix

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Operational Objectives				
Achieves Recommended Runway Length	1	1	3	3
Enhances All Weather Capability	1	1	3	3
Achieves FAA Design Criteria	1	3	3	2
Environmental Considerations				
Land Requirements	3	2	1	1
Obstruction Removal	1	1	1	1
Wetland Impacts	3	1	1	1
Constructability				
Road Relocation	3	3	3	1
Phasing	3	3	3	1
Utilities Impacts	3	3	1	1
14 CFR Part 77 Compliance	1	2	2	2
Cost				
Project Cost	3	2	2	1
TOTAL	23	24	23	17

Source: Delta Airport Consultants, Inc.

Note: Based on Ability to Achieve Evaluation Criteria

1 – Least

2 – Moderate

3 – Best



F. COMMON ASPECTS OF ALL AIRSIDE AND LANDSIDE DEVELOPMENT ALTERNATIVES

As several of the development objectives and consultant recommendations are common to all build alternatives, they are presented in this section of the text, and omitted from repetitive presentation within each alternative.

1. Construct Taxilane Turnout

As noted in Chapter Four, proposed corporate hangars along the north apron would significantly minimize the line-of-sight between converging aircraft. Consequently, to ensure the efficient flow of traffic, it was recommended that a taxilane turnout be constructed in Phase I for each development alternatives.

2. Link Existing AWOS with the NADIN

As highlighted in Chapter Four, it is recommended that the existing AWOS-3 unit be connected to the National Aerospace Data Interchange Network (NADIN) to improve access to weather information. This project is proposed for Phase I in each development alternative.

3. Replace Rotating Beacon (Beacon Only)

Chapter Four recommends that the existing rotating beacon be replaced as it is becoming increasingly difficult to locate bulbs to support routine maintenance. This project is proposed for completion in Phase I of each development alternative.

4. Auto Parking Pavement Rehabilitation

As noted in Chapter Four, the existing auto parking lots are heavily cracked, oxidized, and the markings are severely faded. It was recommended that at a minimum both



parking lots be seal coated, crack sealed, and re-marked as early in the planning period as feasible. This project is proposed for Phase I in each development alternative.

5. Relocate Existing Fuel Farm and Construct Alternative Fuel Site

Chapter Four noted that it is the Owner's desire to analyze the relocation of the fuel farm in order to best meet the environmental requirements and the long term needs of the airport. In addition, an alternative fuel site in a separate location was recommended within the planning period to allow fuel to be purchased 24 hours a day, 7 days a week directly by aircraft operators. These fueling projects are proposed in each development alternative in Phase II.

6. Replace ARFF Vehicle

As discussed in Chapter Four, the Owner advises that the Chesterfield County Fire Department owns and maintains the ARFF vehicle. Although the airport is not required to maintain ARFF capability, the Fire Department intends to replace the vehicle during Phase I of the planning period.

7. Construct SRE Building

Chapter Four recommended that the existing airfield maintenance building be expanded or a snow removal equipment (SRE) building be constructed in Phase II to meet FAA sizing guidelines and to address flooding issues in the current building. This project is proposed in each development alternative. The proposed site for the SRE building in Alternative 3 is a previously disturbed area, which would reduce costs for site preparation.



8. Acquire Class II Rotary Plow, Displacement Plow, Sweeper, and Wheel Loader

As highlighted in Chapter Four, it is recommended that the County acquire a Class II rotary plow and consider acquisition of a second displacement plow. Additional support vehicles such as sweepers and wheel loaders are also recommended for consideration. Acquisition of this equipment is proposed for Phase II in each development alternative.

9. Construct T-Hangars and Conventional Hangars

Airside and landside development considerations focused on several key elements including additional T-hangar and conventional hangar space. Each of the airside and landside development alternatives offers a blend of T-hangar and conventional hangar space. The analysis of facility requirements in Chapter Four indicated that there is existing demand for large T-hangars and conventional hangars; consequently, development of one 10-unit T-hangar (large) and three 100-foot by 120-foot conventional hangars will be planned for Phase I. An additional small 10-unit T-hangar is required in Phase III. The owners/tenants of T-hangars are typically individuals or small companies that prefer exclusive use of a hangar facility; therefore, while the physical facilities available may indicate adequate space until Phase III, additional small T-hangar development may be required prior to forecast demand. In pursuing hangar development, it is important for the airport management to ensure:

- Conceptual layout of future hangar space is available and employed as a guideline in actual development.
- Hangars are proposed near proposed general aviation activity with additional auto parking easily accommodated.
- Facilities are located so as to separate piston and turbine powered aircraft operations as much as possible.
- Hangar and apron space is periodically reevaluated and constructed as needed.



10. Additional Airside and Landside Development

The County has also expressed interest in constructing a pilot activity area, public observation park, and an aviation education facility. Possible site locations complimentary to each land use plan and development objective are illustrated on the following alternative exhibits for land use preservation.

Additionally, the County wishes to designate property at the corner of Route 288 and Whitepine Road as intended for non-aeronautical use. This property is not adjacent to the airfield and is not anticipated to be of need or value for aeronautical purposes given the ultimate plan of development. Discussions by the Master Plan Steering Committee during this study identified the potential of a hotel development on the site.

G. AIRSIDE AND LANDSIDE DEVELOPMENT ALTERNATIVES

As noted in Table 4-23, Project Phasing, the facility requirements are focused on the planned runway extension and associated airfield development. The anticipated demand for new structures are limited to hangars, SRE building, relocation of the fuel farm and establishment of an alternative fuel site, and ancillary aviation related development (pilot activity area, public observation park, and aviation education facility) as planned by the County. Given this, the decision regarding a future crosswind runway and/or parallel runway is the primary consideration in developing a conceptual airport land use plan beyond the 20-year planning period. It should be noted that all ultimate concepts could be 30-50 years prior to development.

Depiction of ultimate development is for land use preservation and future airspace protection. This development includes T-hangars, corporate hangars, apron space, dual taxilanes, auto parking, second surface access, as well as a conceptual location for the ATCT. As the ATCT is not justified at this time, the locations being considered are conceptual only. The ultimate depiction of crosswind and parallel runways are carried forward from the prior ALP to offer the County a variety of layout options. The decision to retain the conceptual crosswind and parallel runways is the result of significant discussion by the Master Plan Steering Committee regarding



ultimate land use planning.

Three alternatives were developed to examine and evaluate feasible concepts for future facility development. The following special design considerations were implemented for each of the airside and landside development alternatives:

- Conventional hangars sited adjacent to previously developed auto parking.
- T-hangars (large and small) located for logical extension of existing development and prior to site work.
- Location of taxiway turn-out to provide optimum visibility for aircraft entering and existing t-hangar area.
- Relocate fuel farm to secure location within direct line-of-sight of terminal apron per County request.
- Locate alternative fuel site for ease of access by GA users, but clear of conflict with corporate jet traffic.
- Reserve site for future ATCT.
- Designate sites for County's community outreach projects; pilot activity center, aviation education facility, and public observation park.
- Expand apron for additional Group I tie-downs.
- Consider site for relocation of airfield maintenance building or construction of an SRE building without precluding additional development.

Phasing of the land development plan is specific to the preferred alternative, thus a detailed phasing plan is presented with the ALP development in Chapter Seven. **Exhibits 6-6 through 6-8** present the facility development alternatives. Potential environmental impacts have been highlighted for each alternative in **Table 6-10** following this section. Qualitative and quantitative comparison matrices of the two runway development build alternatives are presented in **Tables 6-11 and 6-12**.



1. Airside and Landside Development - Alternative 1

Alternative 1 provides a large 10-unit T-hangar east of the north terminal apron and one small 10-unit west of the existing five T-hangars. The three 100-foot by 120-foot conventional hangars are located east of the existing tie-downs, adjacent to the north terminal apron. An additional taxiway turnout/hold apron is proposed for development within Phase I. This development alternative would include the relocation of the fuel farm south of the Phase I conventional hangars and construction of an alternative 24-hour fueling site.

The development in Alternative 1 would also include the construction of a new 7,000 square foot Snow Removal Equipment (SRE) building located north of the existing fire station. Though not justified at this time, a conceptual location for an ATCT between the existing terminal building and maintenance hangar was depicted to protect space for ultimate development.

Approximately 0.02 acres of wetland impacts are associated with the development of this alternative due to the construction of the alternative fuel site. As this is below the 0.1 acre impact threshold for the U.S. Army Corps of Engineers, it is anticipated that a Nationwide Permit could be obtained. Consequently, no wetland mitigation costs would be required.

The estimated development cost of Airside and Landside Development Alternative 1 is approximately \$10.5 million, see **Table 6-7. Exhibit 6-6** illustrates this alternative.

Advantages:

- Meets facility requirements for planning period.
- Provides alternative access road direct to Cogbill Road.
- Provides perimeter road along northern limit of development.
- Maintains ultimate conventional hangar development nearest primary runway with T-hangars behind.



- No additional land required for crosswind or parallel runways.
- Estimated wetland impacts are less than 0.1 of an acre for projects within planning period and therefore could be permitted using U.S. Army Corps of Engineers Nationwide Permit.⁶ Therefore, no wetland mitigation costs are required.

Disadvantages:

- Does not provide for future development of the crosswind or parallel runway.
- Substantial wetland impact for ultimate development of hangars, apron, and access road.

Table 6-7
Chesterfield County Airport
Airside and Landside Alternative 1 Estimated Costs
TERMINAL AREA DEVELOPMENT

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS ¹
1	10-unit T-Hangar (Large)	I	\$600,000 ²
2	Taxiway Turnout/Hold Apron	I	\$250,000
3	Conventional Hangars (3 - 100' x 120')	I	\$5,000,000
4	Beacon Replacement	I	\$50,000
5	Fuel Farm Relocation	II	\$2,000,000
6	Alternative 24-Hour Fueling Site	II	\$150,000
7	SRE building (7,000 sq. ft.)	II	\$1,500,000
8	10-unit T-Hangar (Small)	III	\$900,000 ²
ESTIMATED TOTAL¹			\$10,450,000
ALTERNATIVE 1			

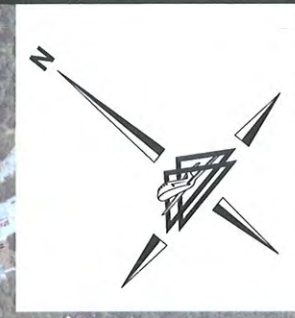
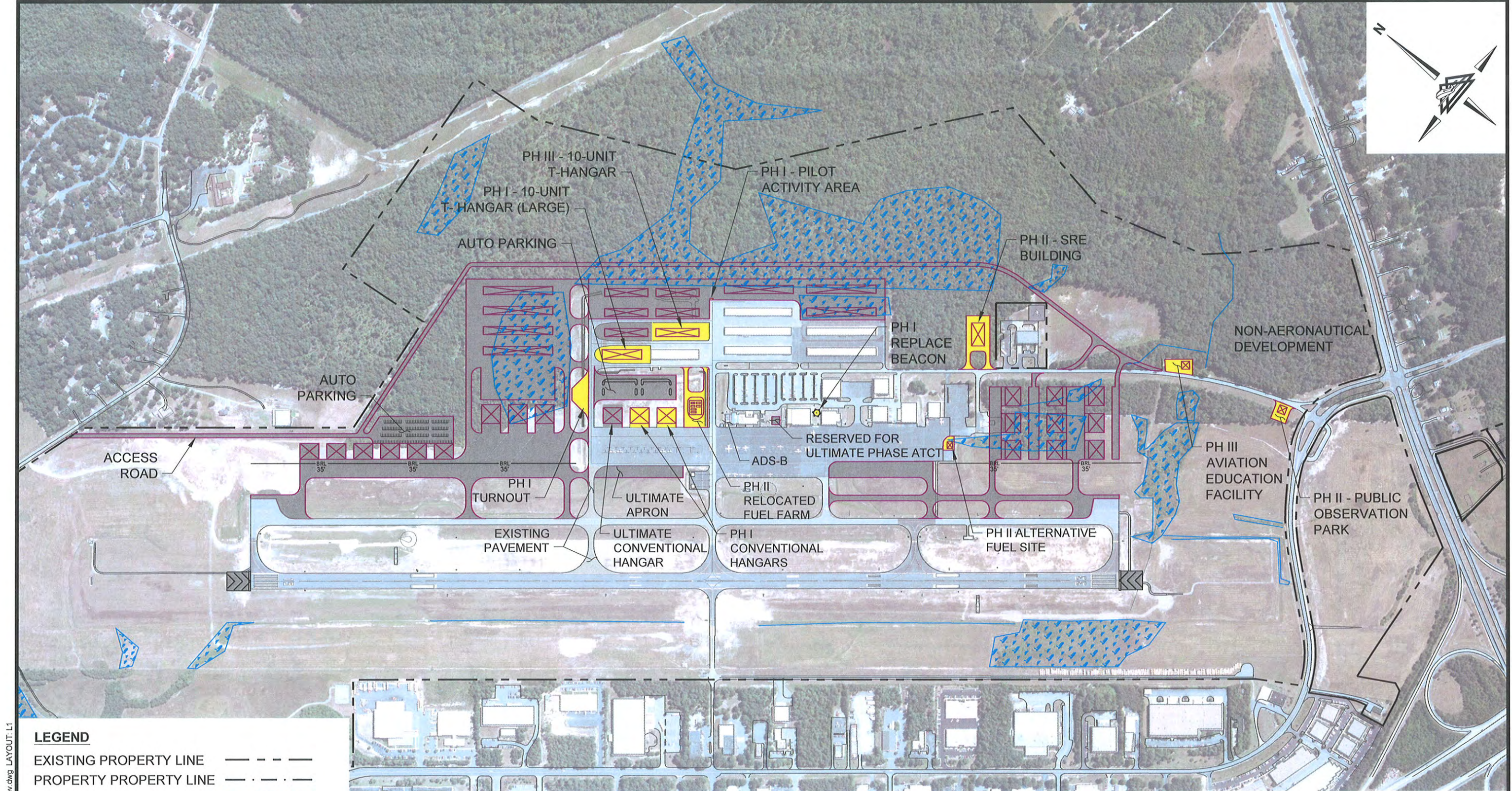
Note: ¹Cost does not include possible wetland mitigation due to impacts from fuel site and T-hangar and taxiway turnout construction.

²Site preparation complete for large 10-unit T-hangar; small 10-unit T-hangar requires site preparation.

Source: Delta Airport Consultants, Inc.

⁶ As grading limits have not been defined, wetland impacts are calculated based upon estimated areas of disturbance. Impacts to wetlands would be refined during the required NEPA process prior to construction.





LEGEND

- EXISTING PROPERTY LINE ———
- PROPERTY PROPERTY LINE - - - - -
- EXISTING WETLANDS
- FACILITY NEEDS (2009-2025)
- ULTIMATE DEVELOPMENT

SOURCES:

1. WETLAND AREA AND STREAM LOCATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009); JURISDICTIONAL DETERMINATION FROM ARMY CORP OF ENGINEERS IS PENDING.



**AIRSIDE & LANDSIDE DEVELOPMENT - ALTERNATIVE 1
CHESTERFIELD COUNTY AIRPORT**

**EXHIBIT
6-6**

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DRAWN BY: LKH CHECKED BY: CMA SCALE: 1" = 600' DATE: OCTOBER 2010

2. Airside and Landside Development - Alternative 2

As in Alternative 1, Alternative 2 locates the recommended T-hangars, conventional hangars, and taxiway turnout in the same location. This development alternative would include the relocation of the fuel farm north of the Phase I conventional hangars and construction of an alternative 24-hour fueling site. This alternative would also include the construction of a new 7,000 square foot Snow Removal Equipment (SRE) building east of the existing fire station. Though not justified at this time, a conceptual location for an ATCT between the existing terminal building and maintenance hangar was depicted to protect space for ultimate development. Alternative 2 also depicts the ultimate development of a crosswind runway to serve ARC B-II aircraft at a length of 3,500 feet.

Approximately 0.5 acres of wetland impacts are associated with the development of this alternative due to the construction of the alternative fuel site, SRE building, and associated apron.

The estimated development cost of Airside and Landside Development Alternative 2 is approximately \$10.8 million, see **Table 6-8. Exhibit 6-7** illustrates this alternative.

Advantages:

- Meets facility requirements for planning period.
- Minimal wetland impacts for development of crosswind runway.
- Reduced wetland impacts from Alternative 1 due to no hangar development north of existing T-hangars.
- Additional conventional hangars with direct surface access from Airfield Drive.
- Allows for ultimate development of crosswind runway.



Disadvantages:

- Crosswind runway precludes northern perimeter access road connecting Airfield Drive to Cogbill Road.
- Additional land acquisition required for development of crosswind runway.
- Conventional hangars located south of existing T-hangars may not be attractive to corporate tenants.
- Wetland impacts of less than one acre⁷ for projects proposed within planning period.

Table 6-8
Chesterfield County Airport
Airside and Landside Alternative 2 Estimated Costs
TERMINAL AREA DEVELOPMENT

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS
1	10-unit T-Hangar (Large)	I	\$600,000 ¹
2	Taxiway Turnout/Hold Apron	I	\$250,000
3	Wetland Mitigation ²	I	\$100,000
4	Conventional Hangars (3 - 100' x 120')	I	\$5,000,000
5	Beacon Replacement	I	\$50,000
6	Fuel Farm Relocation	II	\$2,000,000
7	Alternative 24-Hour Fueling Site	II	\$150,000
8	SRE building (7,000 sq. ft.)	II	\$1,700,000
9	10-unit T-Hangar (Small)	III	\$900,000 ¹
ESTIMATED TOTAL			\$10,750,000
ALTERNATIVE 2			

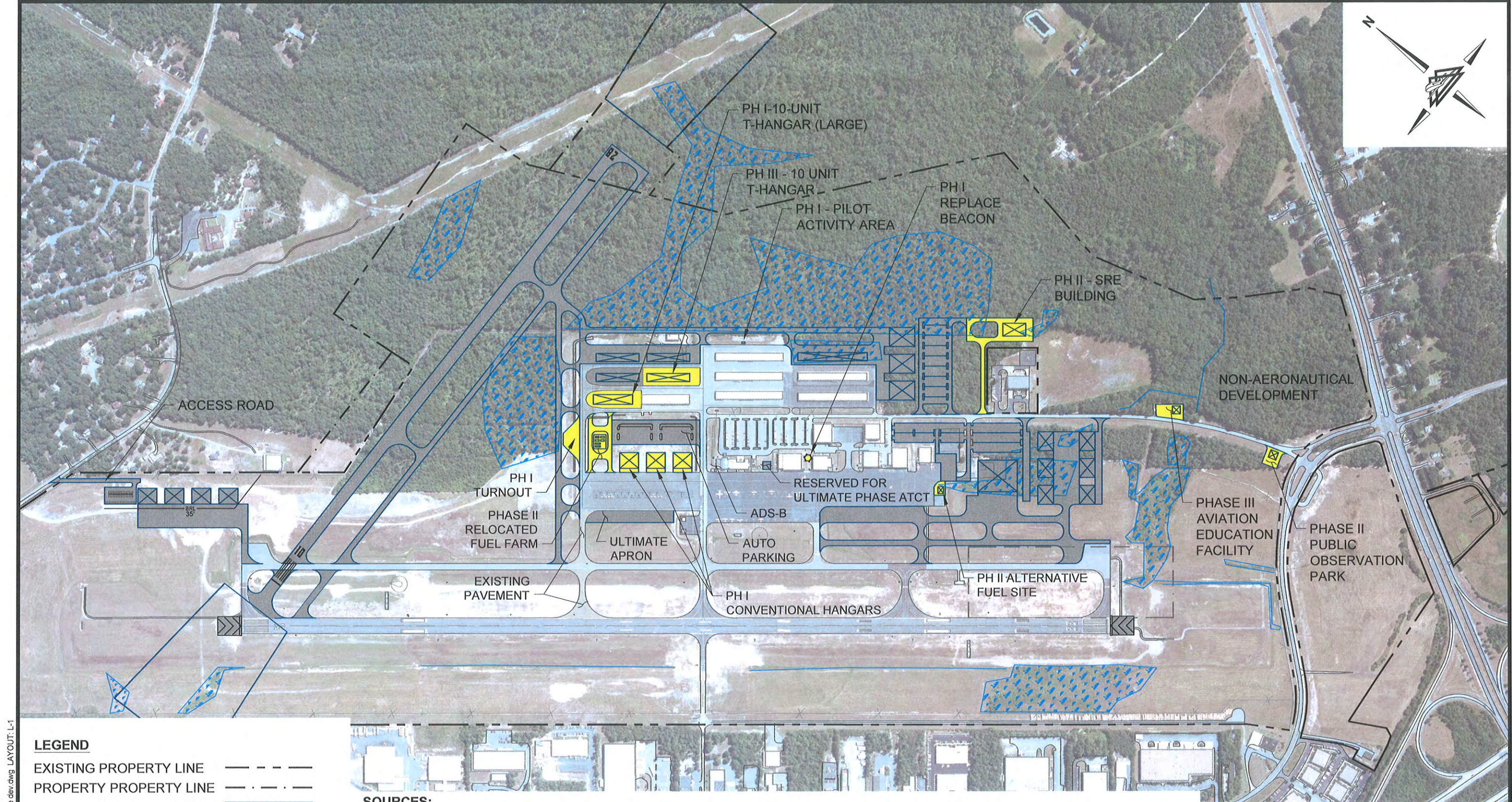
Note: ¹Site preparation complete for large 10-unit T-hangar; small 10-unit T-hangar requires site preparation.

²Wetland mitigation estimated using a 2:1 mitigation ratio at \$100,000 per acre for purchase of mitigation credits through the Nature Conservancy (per coordination with ACOE and Mill Creek Environmental Consultants, Ltd. - May 2010).

Source: Delta Airport Consultants, Inc.

⁷ As grading limits have not been defined, wetland impacts are calculated based upon estimated areas of disturbance. Impacts to wetlands would be refined during the required NEPA process prior to construction..





LEGEND

- EXISTING PROPERTY LINE
- PROPERTY PROPERTY LINE
- EXISTING WETLANDS
- FACILITY NEEDS (2009-2025)
- ULTIMATE DEVELOPMENT

SOURCES:

1. WETLAND AREA AND STREAM LOCATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009); JURISDICTIONAL DETERMINATION FROM ARMY CORP OF ENGINEERS IS PENDING.

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SCALE: 1"=600' FEET

**AIRSIDE & LANDSIDE DEVELOPMENT - ALTERNATIVE 2
CHESTERFIELD COUNTY AIRPORT**

**EXHIBIT
6-7**

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www.deltaairport.com

DRAWN BY: LKH CHECKED BY: CMA SCALE: 1" = 600' DATE: OCTOBER 2010

3. Airside and Landside Development - Alternative 3

As in Alternatives 1 and 2, Alternative 3 locates the recommended T-hangars, conventional hangars, and taxiway turnout in the same location. This development alternative would include the relocation of the fuel farm east of the existing south apron and construction of an alternative 24-hour fueling site. Alternative 3 also includes the construction of a new 7,000 square foot SRE building west of the proposed fuel farm relocation. The proposed site for the SRE building is a previously disturbed area, which would reduce costs for site preparation. Though not justified at this time, a conceptual location for an ATCT between the existing terminal building and maintenance hangar was depicted to protect space for ultimate development. Alternative 3 also depicts the ultimate development of crosswind and parallel runways to serve ARC B-II aircraft. The crosswind runway is depicted at 3,500 feet in length and the parallel runway is depicted at 3,000 feet in length.

Approximately 0.25 acres of wetland impacts are associated with the development of this alternative due to the construction of the alternative fuel site, SRE maintenance building, and associated apron.

The estimated development cost of Airside and Landside Development Alternative 3 is approximately \$10.4 million, see **Table 6-9. Exhibit 6-8** illustrates this alternative.

Advantages:

- Meets facility requirements for planning period.
- Allows for ultimate development of crosswind and parallel runways.
- SRE building proposed for a previously disturbed area, thus reducing cost.
- Additional conventional hangars with direct access to Airfield Drive.

Disadvantages:

- Runway development precludes northern perimeter access road connecting Airfield Drive to Cogbill Road.



- Additional land acquisition required for development of crosswind runway.
- Conventional hangars located south of existing T-hangars may not be attractive to corporate tenants.
- Greatest wetland impact for ultimate development concepts.
- Wetland impacts of less than one acre⁸ for projects proposed within the planning period.

Table 6-9
Chesterfield County Airport
Airside and Landside Alternative 3 Estimated Costs
TERMINAL AREA DEVELOPMENT

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS
1	10-unit T-Hangar (Large)	I	\$600,000 ¹
2	Taxiway Turnout/Hold Apron	I	\$250,000
3	Wetland Mitigation ²	I	\$100,000
4	Conventional Hangars (3 - 100' x 120')	I	\$5,000,000
5	Beacon Replacement (Beacon Only)	I	\$50,000
6	Fuel Farm Relocation	II	\$2,000,000
7	Alternative 24-Hour Fueling Site	II	\$150,000
8	SRE building (7,000 sf)	II	\$1,300,000
9	10-unit T-Hangar (Small)	III	\$900,000 ¹
ESTIMATED TOTAL			\$10,350,000
ALTERNATIVE 3			

Note: ¹Site preparation complete for large 10-unit T-hangar; small 10-unit T-hangar requires site preparation.

²Wetland mitigation estimated using a 2:1 mitigation ratio at \$100,000 per acre for purchase of mitigation credits through the Nature Conservancy (per coordination with ACOE and Mill Creek Environmental Consultants, Ltd. - May 2010).

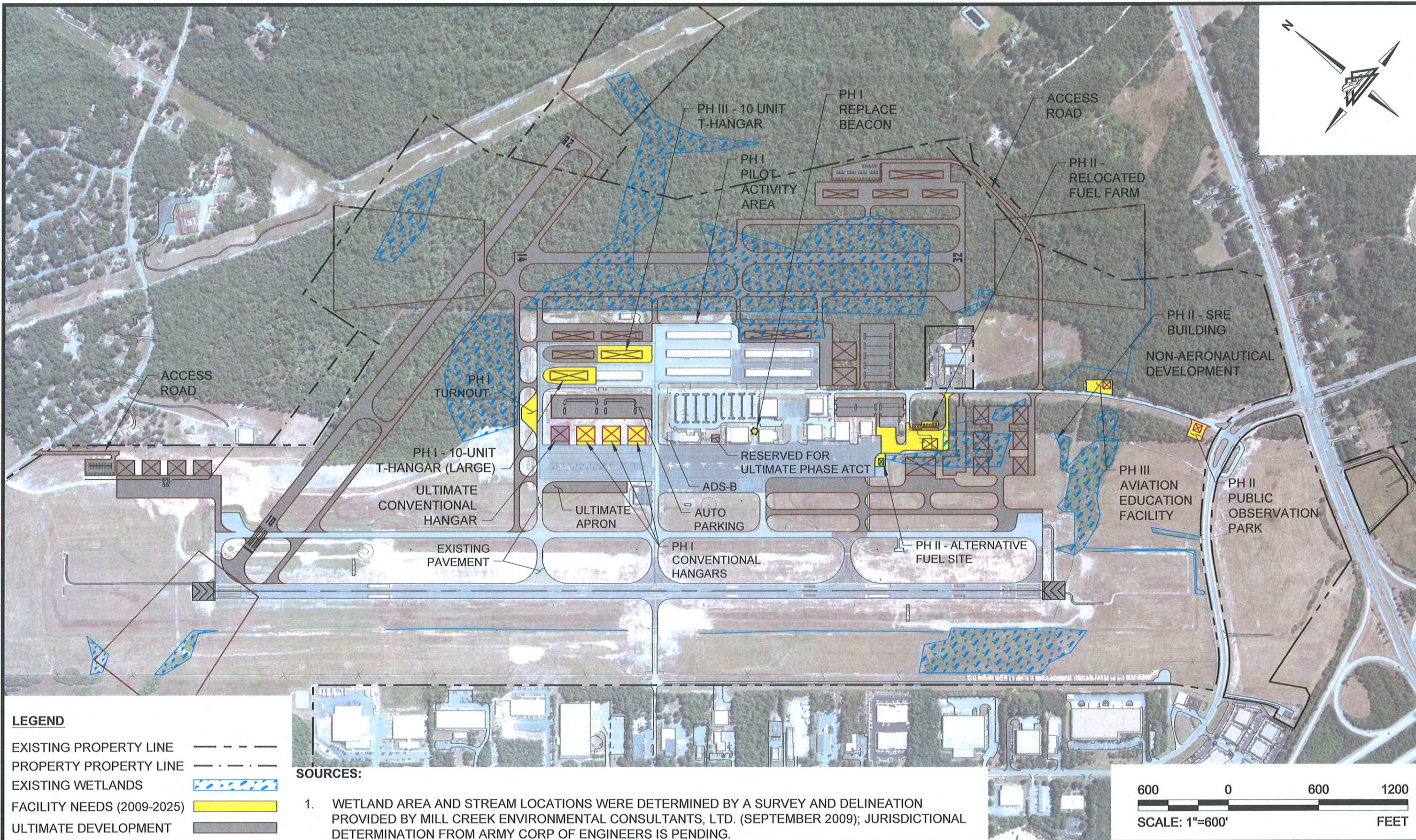
Source: Delta Airport Consultants, Inc.

⁸ As grading limits have not been defined, wetland impacts are calculated based upon estimated areas of disturbance. Impacts to wetlands would be refined during the required NEPA process prior to construction.



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AIRSIDE & LANDSIDE DEVELOPMENT - ALTERNATIVE 3 CHESTERFIELD COUNTY AIRPORT

DRAWN BY: LKH CHECKED BY: CMA SCALE: 1" = 600' DATE: OCTOBER 2010

EXHIBIT
6-8

Table 6-10
Chesterfield County Airport
Comparison of Environmental Consequences for Airside and Landside Development Alternatives^{1, 2}

Impact Category	Alternatives		
	1	2	3
Air Quality	No	No	No
Coastal Resources	No	No	No
Compatible Land Use	No	No	No
Construction Impacts	No	No	No
Department of Transportation 4(f)	No	No	No
Farmlands	No	No	No
Fish, Wildlife, and Plants	Yes – tree removal	Yes – tree removal	Yes – tree removal
Floodplains	No	No	No
Hazardous Materials, Pollution Prevention, and Solid Waste	No	No	No
Historic, Architectural, Archaeological, and Cultural Resources	No	No	No
Light Emissions and Visual Impacts	No	No	No
Natural Resources, Energy Supply, and Sustainable Design	No	No	No
Noise	No	No	No
Secondary (Induced) Impacts	No	No	No
Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks	No	No	No
Water Quality	No	No	No
Wetlands	Yes	Yes	Yes
Wild and Scenic Rivers	No	No	No

Note: ¹Impact evaluation based upon existing information only for airport property. An Environmental Assessment will be completed to evaluate impact categories in detail.

²Evaluation for facility needs within 2009-2025, not ultimate development.

Source: Delta Airport Consultants, Inc. Analysis.



Table 6-11
Chesterfield County Airport
Qualitative Airside and Landside Evaluation Matrix

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3
Program Elements			
Meets Facility Requirements	Yes	Yes	Yes
Expandability - Facilities	Offers greatest flexibility for facility development.	Flexibility remains for northeast perimeter of airfield.	Additional runways ultimately constrain potential facility development.
Operations Performance	Maintains existing runway capacity.	Provides greater all-weather capability for small aircraft.	Provides greater all-weather capability for small aircraft. Enhances capacity.
Airspace Protection	Least protection to surrounding airspace.	Moderate increase from existing runway airspace protection.	Provides greatest protection of airspace surrounding airport.
Constructability			
Site Preparation - Wetlands	Significant earthwork required for north apron development and secondary access road from north. Significant impact to wetlands.	Least anticipated earthwork of the ultimate concepts. Least impact to wetlands.	Significant earthwork involved in ultimate development of parallel runway. Greatest impact to wetlands.
Utilities	Existing utility feeds are extended to the north.	North hangars require new utility access from Cogbill Road.	Remote facilities are greatest challenge, plus significant airfield lighting expansion.
Phasing	Least impact to existing runway operations.	Crosswind runway construction impacts existing runway operations.	Crosswind runway construction impacts existing runway operations.

Source: Delta Airport Consultants, Inc.



The ability of each airside and landside alternative to satisfy evaluation criteria listed in Tables 6-11 and 6-12 was developed on a scale of 1 to 3 with 1 representing an alternative that has the least ability to satisfy particular evaluation criteria and 3 the highest ability to satisfy particular evaluation criteria.

Table 6-12
Chesterfield County Airport
Quantitative Airside and Landside Evaluation Matrix

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3
Program Elements			
Meets Facility Requirements	3	3	3
Expandability - Facilities	3	2	1
Operations Performance	1	2	3
Airspace Protection	1	2	3
Constructability			
Site Preparation - Wetlands	2	3	1
Utilities	2	2	1
Phasing	3	2	2
TOTAL	15	16	14

Note: Ranking Based on Ability to Achieve Evaluation Criteria

- 1 – Least
- 2 – Moderate
- 3 – Best

Source: Delta Airport Consultants, Inc.



H. CONCLUSIONS AND RECOMMENDATIONS

1. Parallel Taxiway 'A' Separation

As a result of taxiway analysis and at the request of the FAA and DOAV, relocation of the taxiway to FAA design standards (400 feet) is recommended for development in Phase III of the planning period. It is recommended that the taxiway relocation occur prior to the next pavement rehabilitation, allowing the existing pavement to reach the end of its useful life. This development has an estimated cost of \$4.0 million.

2. Runway Development

After reviewing and evaluating the three alternatives for Runway Development, and the options for reducing approach visibility minimums, Alternative 3 was recommended and selected by the Master Plan Steering Committee as the preferred alternative.

Alternatives 1 and 2 do not provide the recommended runway length or offer a reduced visibility approach. Alternative 4 provides the recommended runway length; however, it creates a penetration to the 50:1 precision approach surface for Runway 33 and requires relocation of Whitepine Road.

The purpose of the proposed action is for Chesterfield County to provide airfield infrastructure to meet FAA design criteria. The runway length justification narrative in Chapter Four demonstrated the need to extend Runway 15-33 at FCI beyond the existing 5,500 feet consistent with FAA guidance. This need is supported by identification of the “family of medium size business jets” as the critical aircraft (represented by the Gulfstream 200, Challenger 604, and the Hawker 800 aircraft) as well as several other factors including:

- Service to the 100 percent fleet of U.S. business jets and larger;
- Runway length determination for the 100 percent fleet and Part 135 operations;
- Existing operations of the critical aircraft at FCI, both based and transient; and



- Forecast operational levels of the critical aircraft throughout the 20-year planning period.

Based on analysis of operational detail and performance charts presented in Chapter Four, it was recommended that a runway length of 6,300 feet be considered at the critical length requirement and be used as the basis for primary runway planning at FCI. This preferred operational alternative has an estimated development cost of \$15 million.

3. Airside and Landside Development

Based on discussions of the Master Plan Steering Committee (**Appendix I**), Airside and Landside Development Alternative 3 was selected by the committee as the preferred facility development concept. Though this alternative has a lower ranking on Table 6-12 due to its greater wetland impacts, it is the County's preference to maintain both the crosswind and parallel runways for the protection of the airspace and future land use. The County notes that the fire station will likely remain in its current location for the planning period and will continue to serve the airport; consequently, the SRE building is proposed as a new facility. Though not justified at this time, the conceptual location for the proposed air traffic control tower (ATCT) is recommended between the terminal building and the maintenance hangar. This site is the most centrally located when considering potential development of both crosswind and parallel runways. Airside and Landside Development Alternative 3 has an estimated development cost of \$10.4 million.

4. Ultimate Runway Development

As discussed in the runway length justification narrative in Chapter 4, the County requested input from jet operators at FCI to determine an appropriate runway length to meet their needs; the responses typically ranged from 6,000 feet to 7,000 feet. Based on FAA guidance, user responses, and forecast data, it was determined that a runway length of 6,300 feet was necessary for Phase II development; however, as discussed at the March 16, 2010 Steering Committee meeting (**Appendix I**), an ultimate extension to



7,000 feet was selected. Operator provided operational data (as depicted in Table 4-7) highlighted several aircraft that required near, or greater than, 7,000 feet of runway length. The ultimate runway length is also being depicted to protect land use, airspace, and prevent obstructions to the ultimate 14 CFR Part 77 surfaces. The ultimate extension should be reevaluated at the end of the planning period to document justification based on critical aircraft demand. Prior to design of the extension, an additional EA would be required. Approximately 20 acres of additional fee simple land acquisition would be required to protect the RW 15 RPZ and relocation of the localizer, MALSR, and PAPI. Additional airfield lighting would also be necessary. In addition, portions of Cogbill and Belmont roads would be realigned to accommodate the RSA and ROFA as depicted in **Exhibit 6-9**.

It is the County's desire that the non-aeronautical areas on airport property be reserved for the ultimate development of public uses such as hotels. Ultimate development has been depicted for land use preservation and to assist as a guideline for the County as demand for development is presented.

I. MASTER PLAN STEERING COMMITTEE

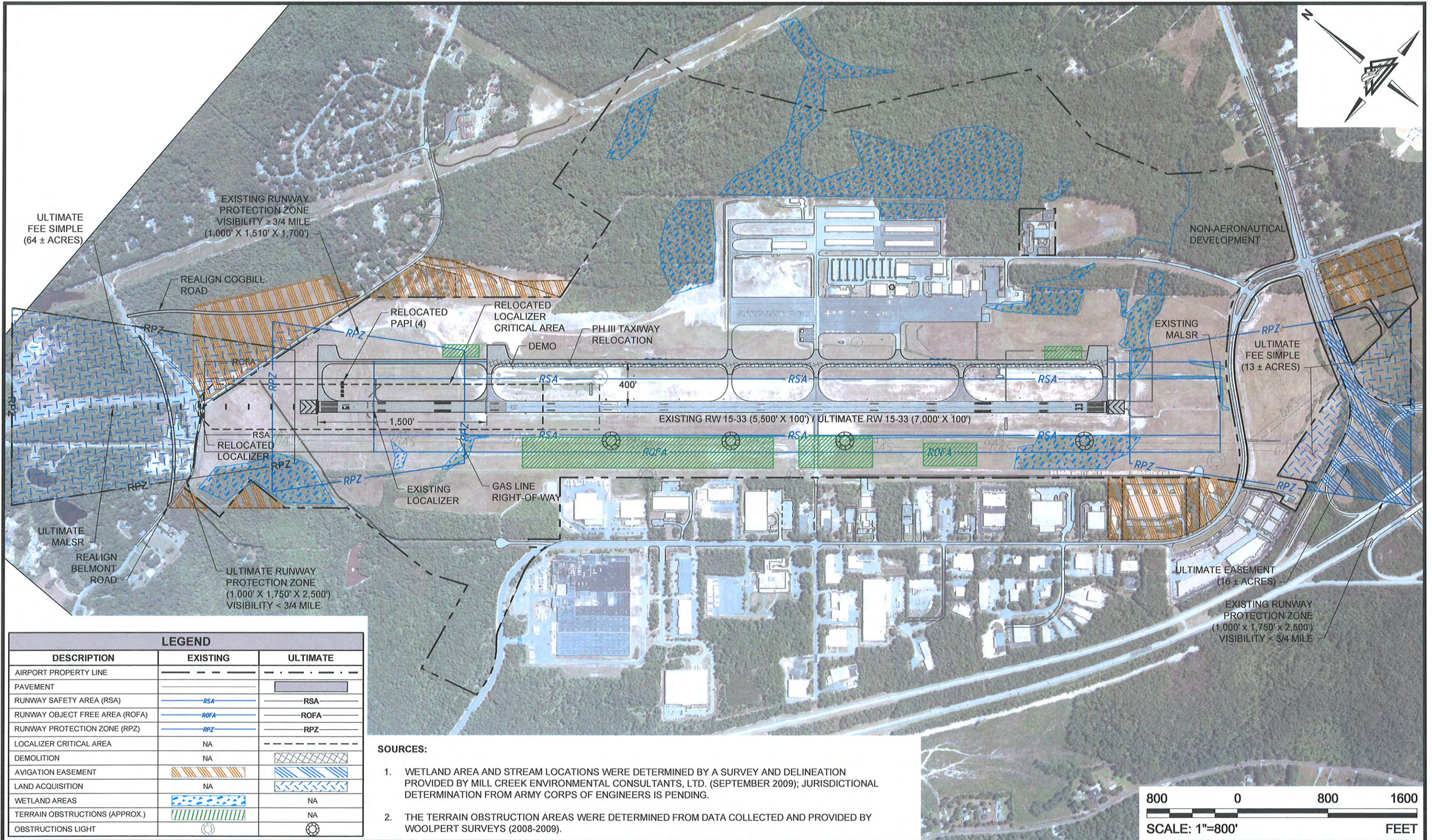
A Master Plan Steering Committee was formed at the initiation of the study process to solicit comments regarding the needs and concerns of the public at large. Discussion notes from the meetings are included as **Appendix I**. The committee is made up of representatives including the Owner, the Airport Advisory Board, tenants and users, as well as representatives from the FAA and DOAV. In addition, one public Open House was held. The draft ALP was presented along with project background information detailing the purpose and need for the improvements and the public was given the opportunity to present written comments as a part of the Open House.

Based upon analysis in the Master Plan and recommendations by the Committee, the Recommended Development Plan is presented in **Exhibit 6-10**.



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LEGEND		
DESCRIPTION	EXISTING	ULTIMATE
AIRPORT PROPERTY LINE		
PAVEMENT		
RUNWAY SAFETY AREA (RSA)	RSA	RSA
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
LOCALIZER CRITICAL AREA	NA	
DEMOLITION	NA	
AVIGATION EASEMENT		
LAND ACQUISITION	NA	
WETLAND AREAS		NA
TERRAIN OBSTRUCTIONS (APPROX.)		NA
OBSTRUCTIONS LIGHT		

SOURCES:

1. WETLAND AREA AND STREAM LOCATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009); JURISDICTIONAL DETERMINATION FROM ARMY CORPS OF ENGINEERS IS PENDING.
2. THE TERRAIN OBSTRUCTION AREAS WERE DETERMINED FROM DATA COLLECTED AND PROVIDED BY WOOLPERT SURVEYS (2008-2009).

ULTIMATE RUNWAY DEVELOPMENT CHESTERFIELD COUNTY AIRPORT

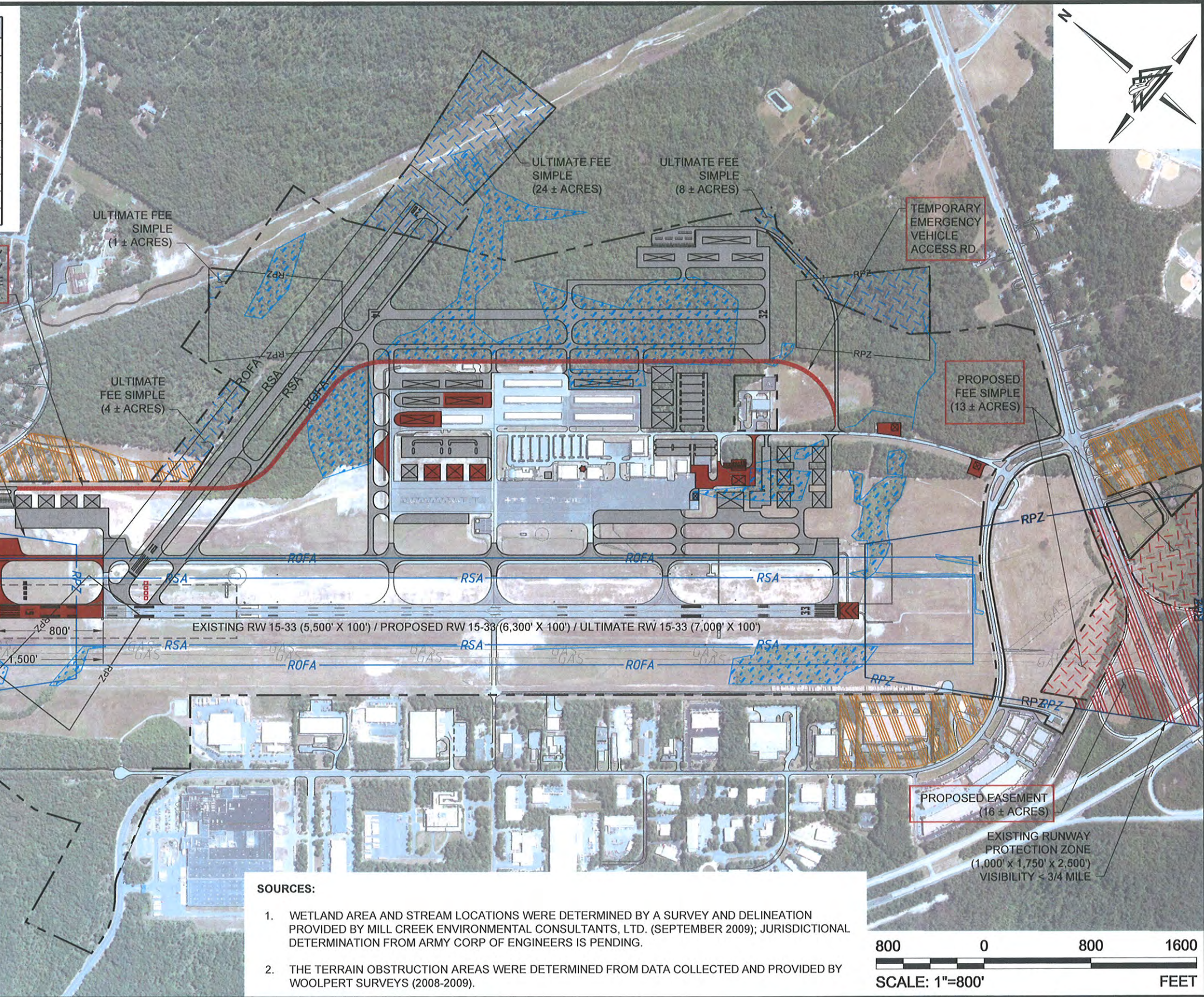
EXHIBIT
6-9

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LEGEND			
DESCRIPTION	EXISTING	PROPOSED	ULTIMATE
AIRPORT PROPERTY LINE	---	---	---
PAVEMENT			
RUNWAY SAFETY AREA (RSA)	—RSA—	—RSA—	—RSA—
RUNWAY OBJECT FREE AREA (ROFA)	—ROFA—	—ROFA—	—ROFA—
RUNWAY PROTECTION ZONE (RPZ)	—RPZ—	—RPZ—	—RPZ—
LOCALIZER CRITICAL AREA	NA	---	---
AVIGATION EASEMENT			NA
LAND ACQUISITION	NA		
WETLAND AREAS		NA	NA
TERRAIN OBSTRUCTIONS		NA	NA



SOURCES:

1. WETLAND AREA AND STREAM LOCATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009); JURISDICTIONAL DETERMINATION FROM ARMY CORP OF ENGINEERS IS PENDING.
2. THE TERRAIN OBSTRUCTION AREAS WERE DETERMINED FROM DATA COLLECTED AND PROVIDED BY WOOLPERT SURVEYS (2008-2009).

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SCALE: 1"=800' FEET

**RECOMMENDED DEVELOPMENT PLAN
CHESTERFIELD COUNTY AIRPORT**

**EXHIBIT
6-10**

DRAWN BY: LKH CHECKED BY: KSK SCALE: 1" = 800' DATE: OCTOBER 2010



A. INTRODUCTION

The Airport Layout Plan (ALP) is a graphic representation of the existing and future development at the Chesterfield County Airport (FCI). As a ‘federally obligated’ airport that accepts federal funding for development and, in exchange, commits to a series of grant assurances related to the operation of the airport, the airport owner (i.e., Chesterfield County) must maintain a current and approved ALP. All proposed development, regardless of funding source, must be identified on an approved ALP prior to implementation.

In order to attain a complete understanding of the Chesterfield County Airport Layout Plan, it is useful to reflect on the alternative concepts and solutions considered in Chapter Six. Based on the recommendations from the consultant and concurrence from the Federal Aviation Administration (FAA), the Virginia Department of Aviation (DOAV), Chesterfield County, and the Master Plan Steering Committee, Runway Development Alternative 3, Landside and Airside Development Alternative 3, and the relocation of Taxiway A, serve as the cornerstones for the adopted plan.

The Airport Layout Plan Update must achieve several specific goals as detailed below:

- Achieve FAA design standards,
- Depict a reasonable development program for new facilities to satisfy current and future demand; and
- Provide Chesterfield County with useful, understandable information and guidance to develop and maintain a safe and efficient airport.

These items are necessary for the airport’s long-term development and operation, as a safe, dependable facility for Chesterfield County and surrounding areas.



The following gives a brief description of the individual Airport Layout Plan sheets included as part of the study. A reduced size copy of each of the drawings addressed is included at the end of this chapter.

The **Cover Sheet** (sheet 1 of 13) is an index of each drawing in the Airport Layout Plan set. A location and vicinity map are shown to aid in identifying the location of the airport. Additionally, All Weather and Instrument Flight Rule (IFR) windroses are shown to illustrate the percentage of time winds of different velocities occur from various compass directions.

The **Existing Airport Layout Drawing (ALD)** (sheet 2 of 13) is a graphic representation of the airfield and associated infrastructure.

The **Proposed Airport Layout Plan (ALP)** (sheet 3 of 13) is a graphic representation of proposed improvements during the planning period. The ALP indicates all pertinent clearance and dimensional information required to develop the facility to FAA design standards. The ALP depicts the recommended location and configuration of facilities required to meet the needs of the airport during the 20-year planning period (2008-2027) as well as desired ultimate development. It is important to note that the ALP serves as a guide for proposed development and is a key document that should be kept current. When formally approved by the FAA, the ALP serves as a public document that is a record of aeronautical requirements, both present and future. An approved ALP is also required for any funding consideration by the FAA and the DOAV.

The **Terminal Area Plan (TAP)** (sheet 4 of 13) sheet depicts an enlarged view of the existing and proposed layout of terminal facilities such as aprons, buildings, and hangars shown on the ALP.

The **Airport Airspace Drawing – Part 77** (sheets 5 and 6 of 13) is the plan view of the 14 CFR Part 77 surfaces based on the ultimate runway length and configuration. Current USGS 7.5 minute Quad sheets are used for the base map.



The **Inner Portion of the Approach Surface Drawing and Tables** (sheets 7, 8, and 9 of 13) for Runways 15 and 33 are projected as plan and profile views for each runway (sheets 7 and 8). Tables associated with the drawings detail existing and proposed obstructions in the inner portion of the approach area for each runway end (sheet 9).

The **Existing Land Use Map** (sheet 10 of 13) presents existing off-airport land uses surrounding FCI. The noise exposure contour for DNL 65 is also shown for the base year (2007) conditions.

The **Future Land Use Map** (sheet 11 of 13) presents future planned off-airport land uses surrounding FCI as identified by the Chesterfield County Planning Department. The noise exposure contour for DNL 65 is also shown for the future (2027) conditions.

The **Airport Property Map** (sheets 12 and 13 of 13, formerly Exhibit “A”) details property and easements owned by the County for airport use. Sheet 12 depicts the boundaries of the existing airport property, identifies owners of adjacent properties, and properties proposed for fee simple and avigation easement acquisition. Sheet 13 contains tables providing historical transaction data and preliminary data for proposed land acquisitions.

B. AIRPORT LAYOUT DRAWING AND TERMINAL AREA PLAN

This section presents details concerning the development of the proposed ALP (sheet 3 of 13) and the TAP (sheet 4 of 13). The ALP and TAP are discussed interchangeably, since both represent existing and future development for FCI on different scales of view. The following narrative briefly describes future development for the 20-year planning period.

1. Runway

As recommended in Chapter Four, Facility Requirements, Runway 15-33 should remain an Airport Reference Code (ARC) category C-II. The facility requirements chapter evaluated Runway 15-33 with respect to length, width, strength, safety area, and object free area for existing and future aircraft. This section discusses the runway geometrics



and respective runway safety and object free areas.

a. Runway 15-33

The existing Runway 15-33 is 5,500 feet long and 100 feet wide. As discussed in Chapter Four, Facility Requirements, the existing useable primary runway length of 5,500 feet was found to be inadequate to accommodate the critical design aircraft operating at FCI (both current and future) as the useful load approaches 90 percent. Based on this analysis and data from operators, it was recommended that a runway length of 6,300 feet be considered as the minimum length requirement and be used as the basis for primary runway planning at FCI. In Chapter Six, Alternatives, Runway Development Alternative 3 depicted an 800 foot extension on the Runway 15 end and was selected as the preferred alternative. This alternative, as illustrated on Exhibit 6-4, has been carried forward to the ALP and is proposed for development during Phase II of the planning period. Additionally, it was recommended that an extension to 7,000 feet of runway length be considered for ultimate development as depicted on Exhibit 6-9. Runway 15-33 blast pads have also been added to the drawing as depicted on the previous ALP for development in Phase II.

b. Runway Safety Area (RSA)

The existing RSA meets FAA standards; however, to remain in compliance, it is required that the RSA be extended to 1,000 feet beyond the end of the runway in conjunction with the recommended extension project.

c. Runway Object Free Area (ROFA)

The existing ROFA meets FAA standards as it is 800 feet wide and 1,000 feet beyond the end of each runway. However, should Runway 15-33 be extended as recommended, accommodation must be made for the extended ROFA. It is



recommended that the necessary land be acquired to protect the extended ROFA. Land acquisition necessary for extended ROFA is illustrated on the ALP.

d. Runway Protection Zones (RPZ)

The airport does not currently own all land within the existing RPZs. The majority of the Runway 15 RPZ is within airport property and the remainder is controlled by the airport via aviation easement. The existing Runway 33 RPZ is not entirely controlled by the airport as a portion of this area overlies the intersection of Routes 288 and I0; however, the existing and proposed use of the property as Virginia Department of Transportation (VDOT) right-of-way does not present an incompatible land use. The recommended extension and proposed establishment of an LPV approach for Runway 15, with lowered visibility minimums, will result in non-compatible land uses in the RPZ. It is recommended that the County acquire the appropriate property interest as illustrated on the ALP, either in fee simple or easement, within existing and future RPZs to prevent incompatible land uses.

2. Taxiways

The existing taxiway system at FCI consists of a full parallel taxiway, Taxiway 'A', which provides a dual use entrance/exit taxiway to each end of Runway 15-33. Taxiway 'A' does not currently meet FAA design standards for runway/taxiway separation. Standard separation for an ARC C-II facility with instrument approach procedure visibility minima below $\frac{3}{4}$ mile is 400 feet, whereas the existing separation between the runway and taxiway at FCI is 375 feet. A Modification of Airport Design Standards (MOS) was approved by the FAA on November 27, 2006 for the non-standard separation between Runway 15-33 and the parallel taxiway. However, that the FAA has requested the taxiway be reconstructed to standard separation and width as illustrated in Exhibit 6-1. This alternative was selected as part of the preferred alternative during the study and has been carried forward to the ALP for development in Phase III.



In addition, each of the existing exit taxiways is 40 feet wide; FAA design standard width is 35 feet. Therefore, a note has been added to the drawing to indicate that the taxiways should be reduced to 35 feet during future rehabilitation projects to meet FAA design standards.

3. Instrument Approach Procedures

There is currently an RNAV (GPS) instrument approach to Runway 15 with established LNAV minima of 680 MSL and one mile visibility. The NAVAID study prepared under direction of the Virginia Department of Aviation (DOAV) includes recommendation of an aeronautical survey to enable development of LPV minima for the existing RNAV (GPS). The DOAV study also recommends installation of a Medium Intensity Approach Lighting System (MALS). The County has requested, and desires to plan for, the inclusion of Runway Alignment Indicator Lights (RAIL) to provide a MALSR installation as was presented in Airside and Landside Development Alternative 3. The MALSR is recommended in Phase II although the County recognizes the addition of the RAIL will require additional justification for the project to move forward. The County also provided feedback to the State on the study requesting restoration of a ground based approach procedure with visibility of less than $\frac{3}{4}$ mile. The extension of Runway 15 or the reduction of LPV visibility minima to lower than $\frac{3}{4}$ miles will require the County to achieve land use control over a greater area as illustrated on the ALP. No additional instrument approach procedures are under consideration for Runway 33.

4. Hangar Facilities

As noted in Chapter Four, Facility Requirements, the planning model used to produce hangar requirements indicates the airport has adequate small T-hangar space to meet the demand until 2027, while additional large T-hangars are needed immediately. It also indicates a deficiency in conventional hangar space. The proposed hangar configuration as depicted on Airside and Landside Development Alternative 3 (Exhibit 6-8) was selected as the preferred layout and was carried forward for inclusion in the ALP. Three



conventional hangars and one T-hangar are proposed for development in Phase I and one additional T-hangar is proposed for construction in Phase III as shown on the ALP.

It is important to note that the timing of hangar development is subject to demand. The construction of suitable conventional hangars will aid the airport in attracting additional aircraft. The proposed dimensions for conventional hangars are approximate and will vary according to the particular needs of each tenant. Hangars should only be constructed as demand for them is realized or anticipated.

5. Airport Access

As noted in Chapter Four, Facility Requirements, the Owner, FBO, and users requested consideration of a second surface access via Cogbil Road be evaluated during this planning study. As both Route 10 and 288 are primary arteries serving the greater Richmond area, there is currently no justification for a second access to the airport. However, as depicted in Airside and Landside Development Alternative 3, crosswind and parallel runways are planned for ultimate development. Consequently, a secondary surface access would be necessary to provide access to the north side of the airfield. As discussed in Chapter Four, the County has also requested the development of a temporary emergency vehicle access road as illustrated on Exhibit 6-10. The emergency access would be planned early in the ultimate phase and would not be constructed so as to interface with the ultimate crosswind or parallel runways, which are both anticipated to be well beyond the 20-year planning period. Both the secondary surface access and temporary emergency vehicle access have been carried forward for inclusion in the ALP.

6. Airfield Maintenance and Equipment Building

As discussed in Chapter Four, Facility Requirements, FAA guidelines recommend an SRE building size of 7,000 square feet for medium size airports to accommodate each support area as well as additional space to store the snow removal equipment and snow and ice control materials. However, at this time the County wishes to pursue an



expansion of the existing airfield maintenance and equipment building in two phases as illustrated on the ALP. Phase II includes a 1,500 square foot expansion to the existing building for airfield maintenance and an additional 2,000 square feet in the ultimate phase to store future snow removal equipment. The SRE building illustrated in the preferred airside and landside development alternative has been eliminated from the ALP drawing.

7. Fuel Farm and Alternative Fueling Site

As noted in Chapter Four, it is the Owner's desire to relocate the fuel farm in order to best meet the environmental requirements and the long term needs of the airport. In addition, an alternative fuel site was recommended within the planning period to allow fuel to be purchased 24 hours a day, 7 days a week directly by aircraft operators. The configuration of both fueling projects, as depicted on Airside and Landside Development Alternative 3 (Exhibit 6-8), was selected as the preferred layout and carried forward for inclusion in the ALP.

8. Air Traffic Control Tower

An Air Traffic Control Tower (ATCT) feasibility analysis was conducted during this study and a proposed site location was identified on Airside and Landside Alternative 3 (Exhibit 6-8). As the ATCT is not justified at this time, the locations being considered are conceptual only. This alternative was selected as the preferred development and carried forward for inclusion on the ALP for ultimate phased development.

C. AIRPORT AIRSPACE DRAWING

Federal Regulation 14 CFR Part 77, "Objects Affecting Navigable Airspace", establishes criteria for evaluation obstructions. This section presents a discussion of 14 CFR Part 77 standards and their relationship to the physical features and terrain on and around the Chesterfield County Airport. A plan sheet has been prepared to depict 14 CFR Part 77 surfaces (sheets 5 and 6 of 13).



The protected imaginary surfaces (14 CFR Part 77) are established relative to runways at the airport. The size of each imaginary surface is based on the runway category and the existing/proposed approaches (visual, non-precision, or precision). The slope and dimensions of the respective approach surfaces are determined by the most precise existing or future approaches for the runway end. The following is a definition of the individual surfaces:

- **Primary Surface** – A rectangular area symmetrically located about the runway centerline and extending a distance of 200 feet beyond each runway threshold. Its elevation is the same as that at a given point along the runway. The total width of the primary surface for Runway 15-33 is 1,000 feet.
- **Transition Surface** – There are three different transition surfaces. One is off the sides of the primary surface, the second is off the sides of the approach surface, and the last is outside the conical surface and pertains to precision instrument runways only. All transition surface slopes are seven foot horizontally for every one foot vertically measured perpendicular to the runway centerline.
- **Approach Surface** – These surfaces begin at the ends of the primary surface (200 feet beyond the runway threshold) and slope upward vertically. The width and elevation of the inner ends conform to that of the primary surface, while the slope, length, and width of the outer end are governed by the runway service category and existing or proposed instrument approaches. The slope for the existing approach surfaces at FCI is 34:1 for Runway 15 and 50:1 for Runway 33.
- **Horizontal Surface** – An oval shaped, level area situated 150 feet above the established airport elevation. Its dimensions are governed by the runway service category. The horizontal surface elevation for FCI is 387 feet above mean sea level.
- **Conical Surface** – A sloping area whose inner perimeter conforms to the shape of the horizontal surface. It extends outward for a distance of 4,000 feet measured horizontally, and slopes upward at 20 feet horizontally for every one foot vertically.

The 14 CFR Part 77 Imaginary Surfaces for FCI are overlayed on a United States Geologic Survey (USGS) 7.5 minute quadrangle (1"=2,000') composite for the area around the airport. These surfaces include the approaches to Runways 15 and 33. The airport and localities should



also be aware of FAA Form 7460-1¹ which notifies the FAA of any proposed development which could potentially become an obstruction to airspace around the airport.

D. INNER PORTION OF THE APPROACH SURFACE DRAWING

Runway 15 and 33 Inner Portion of the Approach Surface Drawings (sheets 7, 8, and 9 of 13) were used to evaluate each runway end for potential obstructions. Roadways were also evaluated according to criteria outlined in 14 CFR Part 77. 14 CFR Part 77 requires a minimum clearance of 10 feet for private roadways, 15 feet for public roadways, and 17 feet for interstates from the approach surface.

The approach slope for each runway end varies with the type of navigational aid available. As a general rule, the more precise the approach, the less the slope of the approach surface. Existing obstructions are noted and tabulated on the sheets.

E. EXISTING AND PROPOSED LAND USE DRAWINGS

The land use drawings (sheets 10 and 11 of 13) depict existing and proposed land uses surrounding the airport. As previously discussed in Chapter Two, the airport is currently zoned light industrial and surrounding land uses include neighborhood and regional mixed uses to the east and residential land to the north of airport property. Guidelines for land use compatibility around airports with respect to noise guidelines are presented in Table 5-2. As shown, no incompatible land use exists within the existing and future noise contours.

The Code of Chesterfield County, VA, Section 19-507 lists height exemptions and limitations established as overlay zones as they apply to FCI. The purpose of the Code is to prevent the creation or establishment of structures which would constitute hazards or obstructions to aircraft operating to, from or in the vicinity of FCI. As stated in the Code, the height restrictions or floors for the individual zones shall be those planes delineated as surfaces in Part 77.25, Subchapter E (Airspace), of Title 14 of the Code of Federal Regulations. The zones listed in the

¹ FAA Form 7460-1, Notice of Proposed Construction or Alteration.



Code include the airport, approach, transitional, conical, and primary zones. The County has obtained several aviation easements to protect these 14 CFR Part 77 surfaces.

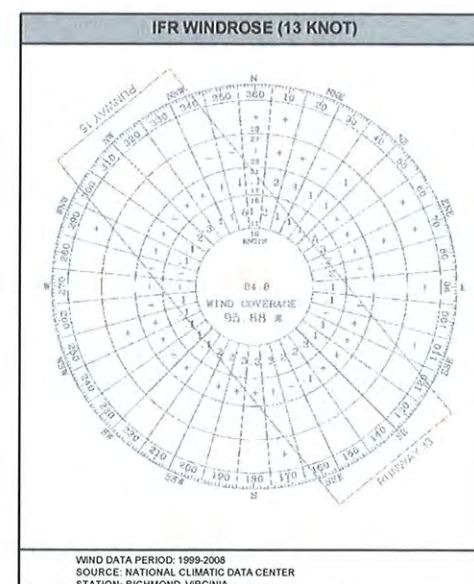
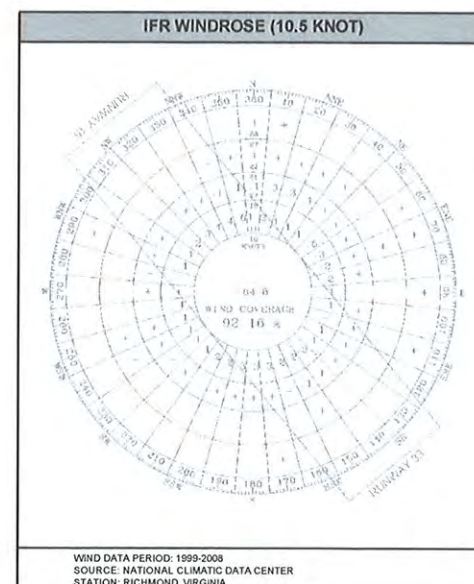
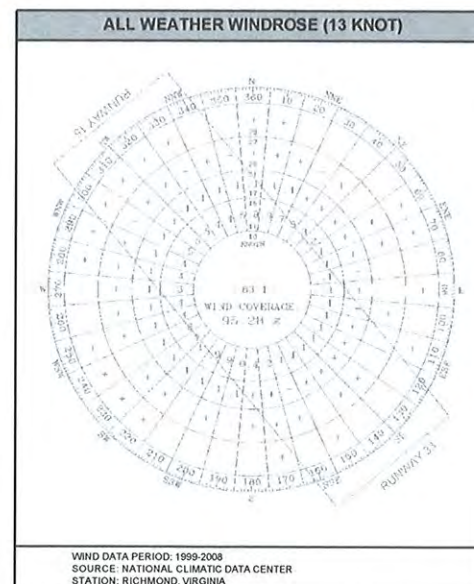
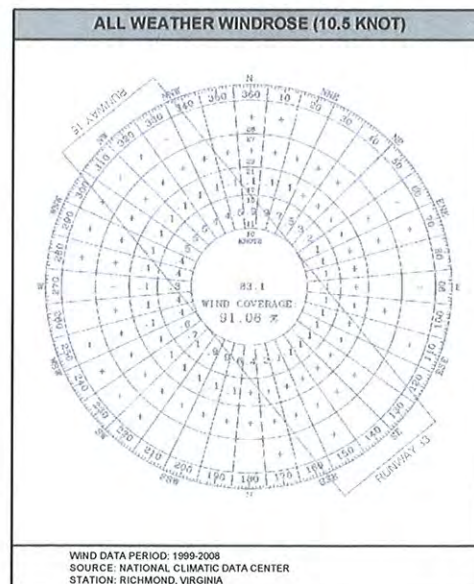
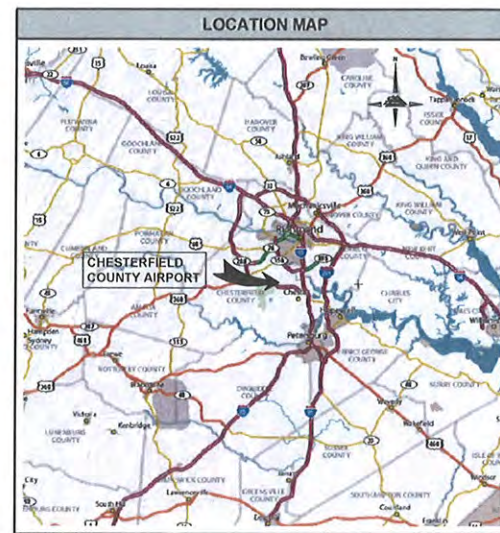
F. AIRPORT PROPERTY MAP

The Airport Property Map (sheets 12 and 13 of 13) depicts the existing boundaries of the airport property. As FCI does not currently own all land within the designated RPZ, this area has been depicted on the APM for fee simple and easement acquisition in Phase I. In addition, areas of aviation easement are depicted on the property map for the removal of tree obstructions, which are hazardous to air navigation.



AIRPORT LAYOUT PLAN UPDATE

NOVEMBER 2011



INDEX	
SHEET NO.	TITLE
1	COVER SHEET
2	FACILITIES LAYOUT PLAN
3	AIRPORT LAYOUT PLAN
4	TERMINAL AREA PLAN
5	AIRPORT AIRSPACE DRAWING
6	AIRPORT AIRSPACE DRAWING
7	RUNWAY 15 INNER APPROACH
8	RUNWAY 33 INNER APPROACH
9	INNER APPROACH TABLES
10	EXISTING LAND USE
11	FUTURE LAND USE
12	AIRPORT PROPERTY MAP
13	AIRPORT PROPERTY MAP TABLES

[illegible]

COVER SHEET			
CHESTERFIELD COUNTY AIRPORT RICHMOND, VIRGINIA			
 DELTA AIRPORT CONSULTANTS, INC. www.deltairport.com			SHEET 1 OF 13
DRAWN BY:	LKH	SCALE:	NONE
CHECKED BY:		DATE:	NOVEMBER 2011

cc: Susan Simmers, DOAV, W/Encl.
Eleanor Schiffilin, AEA-610, W/Encl.
Roy Lewis, Delta Airport Consultants, W/Encl.

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DRAWING 06131-1p-ex.dwg LAYOUT L1
XREFS 06131-1p-ex.dwg 06131-1p-ex.dwg

RUNWAY DATA TABLE	
DESCRIPTION	RUNWAY 15/33 EXISTING
RUNWAY END COORDINATES (NAD 83)	
LATITUDE	(15) 37° 24' 44.33" N (33) 37° 24' 02.01" N
LONGITUDE	(15) 77° 31' 50.60" W (33) 77° 31' 07.99" W
APPROACH MINIMUMS	(15) > 3/4 MILE (33) < 3/4 MILE
PART 77 CATEGORY	OTHER THAN UTILITY (15) 34.1
APPROACH SURFACE SLOPE	(33) 50.1 / 40.1
RUNWAY WIDTH	100
RUNWAY LENGTH	5,500
DISPLACED THRESHOLD	NA
SURFACE TYPE	ASPHALT-GROOVED
PAVEMENT STRENGTH (LBS)	
SINGLE WHEEL	50,000
DUAL WHEEL	80,000
RUNWAY LIGHTING	HIRL
RUNWAY MARKING	(15) NON-PRECISION (33) PRECISION
EFFECTIVE GRADIENT (%)	0.65
MAXIMUM GRADE (%)	0.0
LINE OF SIGHT VIOLATIONS	NONE
WIND COVERAGE (%) ALL WEATHER	(10.5 KNOTS) 91.00% (13 KNOTS) 95.26% (15) REILS, PAPI
VISUAL APPROACH AIDS	(33) MALSR, PAPI
INSTRUMENT APPROACH AIDS	(33) RLS / DME
AIRPORT REFERENCE CODE (ARC)	C - II
CRITICAL AIRCRAFT	GULFSTREAM 200
RUNWAY SAFETY AREA (RSA) DIM.	500' X 7,500'
RUNWAY OBJECT FREE AREA (ROFA) DIMENSION	800' X 7,500'
OBSTACLE FREE ZONE (OFZ) DIM.	400' X 5,500'
RUNWAY END ELEVATIONS (MSL)	(15) 236.1' (33) 199.2'
MAX. ELEVATION (MSL)	237
DISPLACED THRESHOLD ELEVATION (MSL)	NA
TDZ ELEVATION (MSL)	(33) 216.8'
EFFECTIVE RUNWAY LENGTH	5,500'

LEGEND	
DESCRIPTION	EXISTING
RUNWAY CENTERLINE	
AIRPORT PROPERTY LINE	
PRIMARY SURFACE	
PAVEMENT	
RUNWAY SAFETY AREA (RSA)	
RUNWAY OBJECT FREE AREA (ROFA)	
RUNWAY PROTECTION ZONE (RPZ)	
TAXIWAY OBJECT FREE AREA (TOFA)	
TAXIWAY SAFETY AREA (TSA)	
UTILITY EASEMENT (GAS)	
RUNWAY VISIBILITY ZONE	
FENCE	
GROUND ELEVATION CONTOURS	
TREE LINE	
GLIDESLOPE CRITICAL AREA	
LOCALIZER CRITICAL AREA	
AVIGATION EASEMENT	
WETLANDS	
AIRPORT BUILDINGS	
PRECISION OBJECT FREE ZONE (POFZ)	
ROTATING BEACON	
WIND CONE / WINDSOCK	
AIRPORT REFERENCE POINT	
HOLDLINE	
REILS	
AWOS	
PAPI	
OBSTRUCTION LIGHTS	
CEMETERY (SEE NOTE 7)	

MODIFICATIONS OF DESIGN STANDARDS				
NO.	STANDARD MODIFIED	FAA STANDARDS	EXISTING CONDITION	PROPOSED ACTION
1	PARALLEL TAXIWAY TO RUNWAY SEPARATION	400'	375'	RELOCATE PARALLEL TAXIWAY

AIRPORT DATA TABLE	
DESCRIPTION	EXISTING
AIRPORT ELEVATION (MSL)	237'
AIRPORT REFERENCE POINT (NAD 83)	
LATITUDE	37° 24' 23.20" N
LONGITUDE	77° 31' 29.40" W
MEAN MAX TEMPERATURE HOTTEST MONTH	68.8° F
AIRPORT TERMINAL AREA HAZARDS	AWOS, BEACON, SEGMENTED CIRCLE, & WINDSOCK (LIGHTED)
MAGNETIC VARIATION (WWW.NOAA.GOV)	10° 6' W (0° 1' W / YEAR)
DATE OF MAGNETIC VARIATION	NOV 2010
HPIAS SERVICE LEVEL	RELIEVER
STATE SERVICE LEVEL	RELIEVER
WIND COVERAGE CROSSWIND COMPONENT	
ALL WEATHER (10.5 KNOTS)	91.06 %
ALL WEATHER (13 KNOTS)	95.26 %
AIRPORT REFERENCE CODE	C-II
DESIGN AIRCRAFT	GULFSTREAM 200
TAXIWAY LIGHTING	MILTS
TAXIWAY MARKING	BASIC

FACILITIES TABLE	
#	FACILITY NAME
1	TERMINAL BUILDING
2	FBO / MAINTENANCE HANGAR
3	CONVENTIONAL HANGAR PRIVATE
4	ELECTRICAL VAULT
5	FBO HANGAR - COMMUNITY
6	STATE POLICE AVIATION
7	CIVIL AIR PATROL
8	CONVENTIONAL HANGAR
9	CONVENTIONAL HANGAR
10	DISTRICT 15 FIRE STATION
11	Y-HANGAR (20-UNIT SMALL)
12	Y-HANGAR (20-UNIT SMALL)
13	Y-HANGAR (20-UNIT SMALL)
14	Y-HANGAR (20-UNIT SMALL)
15	Y-HANGAR (20-UNIT SMALL)
16	Y-HANGAR (10-UNIT FLANGE)
17	MAINTENANCE / EQUIP. STORAGE
18	FUEL FARM
19	WASH RACK

NON-STANDARD CONDITIONS			
NO.	NON-STANDARD CONDITION	EXISTING CONDITION	FAA STANDARD (C-4)
1	EXISTING TAXIWAYS A, B, C, D, E WIDTH	40'	35'

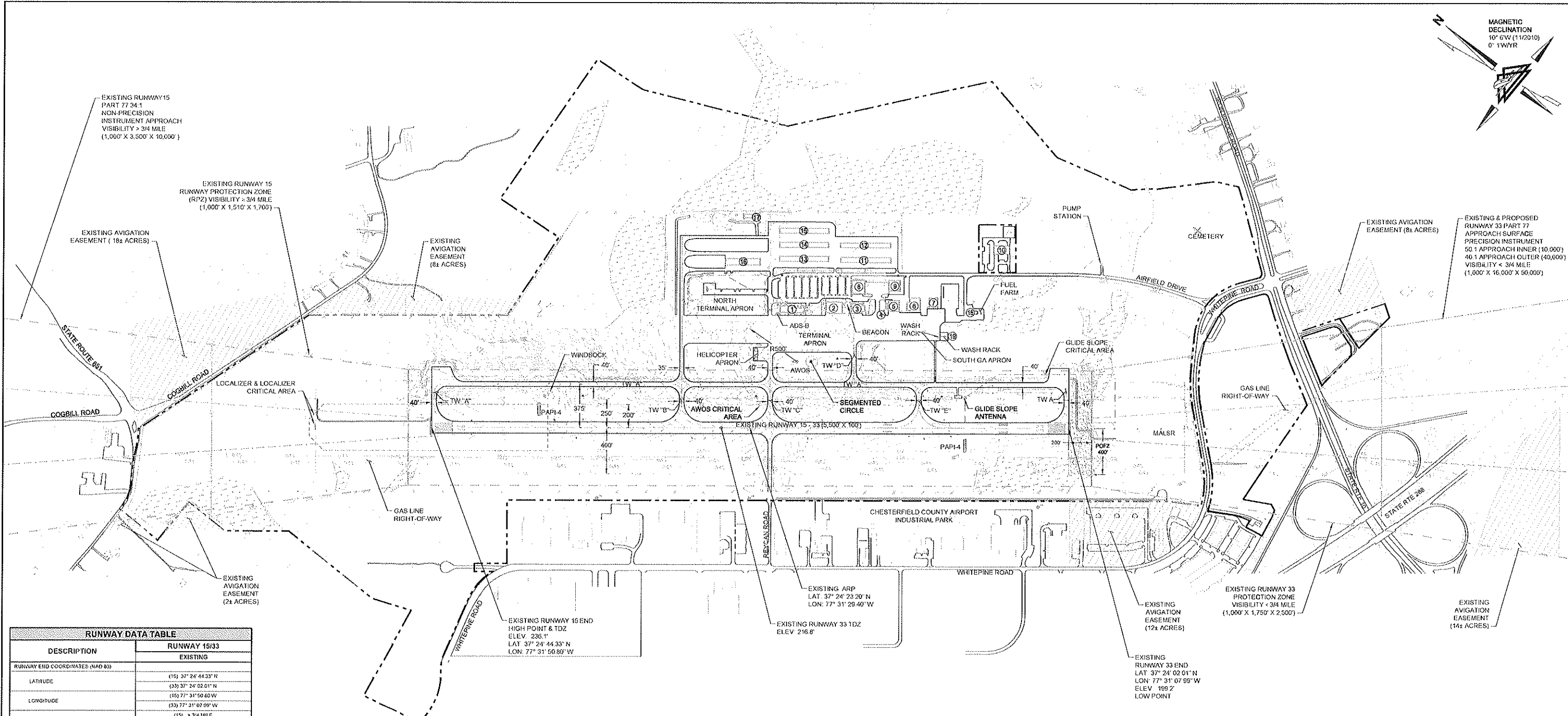
NOTES	
1	ALL ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL.
2	ALL ELEVATIONS ARE IN ACCORDANCE WITH NATIONAL MAP ACCURACY STANDARDS. SPOT ELEVATIONS AND GROUND CONTOURS ARE DERIVED FROM AERIAL PHOTOGRAMMETRY AND ARE APPROXIMATE. GROUND SURVEYS ARE RECOMMENDED TO VERIFY ACCURACY.
3	ALL LATITUDE AND LONGITUDE COORDINATES ARE NAD 83.
4	THERE ARE NO KNOWN OBJECTS THAT PENETRATE THE THRESHOLD AREAS.
5	TOPO AND MOST PLAINIMETRICS FROM AERIAL SURVEYS OBTAINED FROM POTOMAC AERIAL SURVEYS. SOME PLAINIMETRICS RETAINED FROM PREVIOUS ALP.
6	WETLAND AREAS AND STREAM LENGTH CALCULATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009).
7	THE LOCATION OF THE FARMER FAMILY CEMETERY IS APPROXIMATE.
8	LEGEND ELEMENTS REPRESENT DEPICTIONS ON DRAWING BUT MAY VARY IN SIZE DUE TO SCALING ON DRAWING.

REVISIONS				
NO.	REVISIONS	BY	APP.	DATE

CHESTERFIELD COUNTY AIRPORT	
APPROVED	DATE
VIRGINIA DEPARTMENT OF AVIATION	
APPROVED	DATE
FEDERAL AVIATION ADMINISTRATION	
APPROVED	DATE

FACILITIES LAYOUT PLAN	
CHESTERFIELD COUNTY AIRPORT RICHMOND, VIRGINIA	
	
DRAWN BY: LKH	SCALE: 1" = 400'
CHECKED BY: CMC	DATE: NOVEMBER 2011

SHEET	2
OF	13

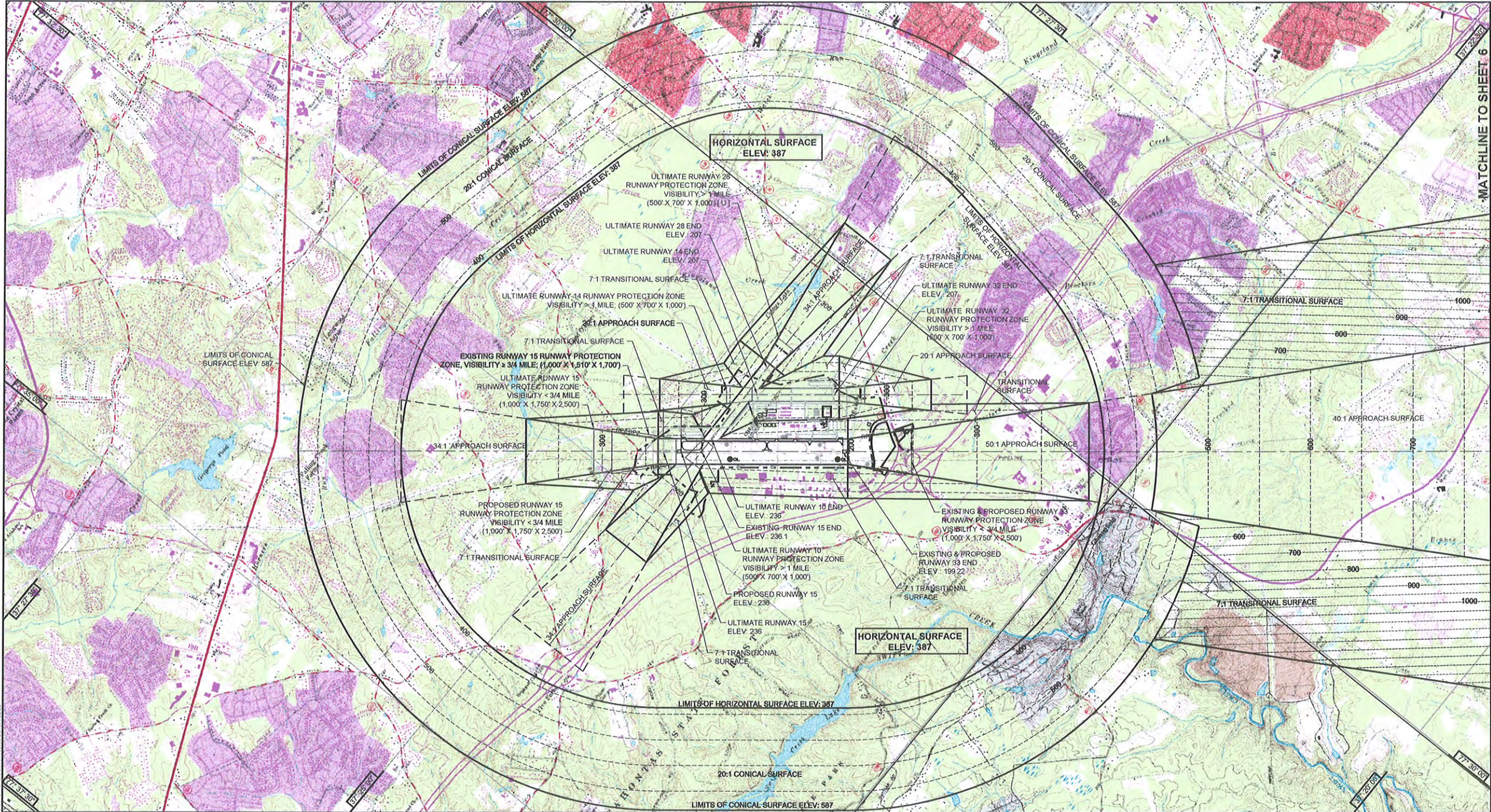




DEVELOPMENT PROGRAM	
PHASE I DEVELOPMENT (2008 - 2012)	I
PHASE II DEVELOPMENT (2013 - 2017)	II
PHASE III DEVELOPMENT (2018 - 2027)	III
ULTIMATE DEVELOPMENT (BEYOND 2027)	U

	NOTES	
1.	ALL ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL.	
2.	ALL ELEVATIONS ARE IN ACCORDANCE WITH NATIONAL MAP ACCURACY STANDARDS. SPOT ELEVATIONS AND GROUND CONTOURS ARE DERIVED FROM AERIAL PHOTOGRAMMETRY AND ARE APPROXIMATE. GROUND SURVEYS ARE RECOMMENDED TO VERIFY ACCURACY.	
3.	ALL LATITUDE AND LONGITUDE COORDINATES ARE NAD 83.	
4.	TOPS AND MOST PLANIMETRICS FROM AERIAL SURVEYS OBTAINED FROM POTOMAC AERIAL SURVEYS (JUNE 2008) IN ADDITION TO SOME PLANIMETRICS RETAINED FROM THE PREVIOUS ALP (JANUARY 2005).	
5.	ALL FUTURE DEVELOPMENT MUST MEET THE FULL DESIGN STANDARDS LISTED IN FAA AC 150/530-13.	
6.	THE BUILDING RESTRICTION LINE (BRL) SHOULD BE LOCATED ON AN AIRPORT LAYOUT PLAN TO IDENTIFY SUITABLE LOCATIONS FOR BUILDING AREAS ON AIRPORT PROPERTY. THE BRL IS DEPICTED BASED ON FAR PART 77 SURFACE FOR A GIVEN DISTANCE FROM THE RUNWAY CENTERLINE. SPECIFIC SITE DEVELOPMENT MUST BE FURTHER EVALUATED BASED ON TOP ELEVATION OF PROPOSED STRUCTURE. IT IS RECOMMENDED THAT THE BRL ENCOMPASS THE RUNWAY PROTECTION ZONES, THE RUNWAY VISIBILITY ZONE, AND AREAS REQUIRED FOR AIRPORT TRAFFIC CONTROL TOWER CLEAR LINES OF SIGHT.	
7.	WETLAND AREA AND STREAM LENGTH CALCULATIONS WERE DETERMINED BY A SURVEY AND DELINEATION PROVIDED BY MILL CREEK ENVIRONMENTAL CONSULTANTS, LTD. (SEPTEMBER 2009).	
8.	THE TOP ELEVATIONS FOR PROPOSED FACILITIES ARE APPROXIMATE.	
9.	THE LOCATION OF FARMER FAMILY CEMETERY IS APPROXIMATE.	
10.	DURING PHASE III DEVELOPMENT, IN ADDITION TO THE RELOCATION OF TAXIWAY "A" TO MEET FAA DESIGN STANDARDS, EXISTING 40' TAXIWAYS ARE TO BE REDUCED TO 35'.	
11.	LEGEND ELEMENTS REPRESENT DEPICTIONS ON DRAWING BUT MAY VARY IN SIZE DUE TO SCALING ON DRAWING.	

TERMINAL AREA PLAN		
CHESTERFIELD COUNTY AIRPORT RICHMOND, VIRGINIA		
 DELTA AIRPORT CONSULTANTS, INC. www.deltairport.com	SHEET	4
	OF	13
DRAWN BY: LKH	SCALE: 1" = 200'	



MAGNETIC DECLINATION
10° 6'W (11/2010)
0° 1'WYR

LEGEND

- APPROXIMATE TOWER
- EXISTING OBSTRUCTION LIGHT
- PROPOSED OBSTRUCTION LIGHT
- EXISTING PROPERTY LINE
- EXTENDED RUNWAY CENTERLINE
- PART 77 SURFACE ELEVATIONS
- MOST DEMANDING PART 77 SURFACE
- EXISTING RUNWAY PROTECTION ZONE
- PROPOSED RUNWAY PROTECTION ZONE
- ULTIMATE RUNWAY PROTECTION ZONE
- EXISTING TERRAIN (PROFILE VIEW)

- NOTES**
- ALL ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL (MSL).
 - THIS EXHIBIT DEPICTS AIRPORT IMAGINARY SURFACES AS DEFINED IN FEDERAL REGULATION 14 CFR PART 77 SECTION 25.
 - PLEASE REFER TO INNER PORTION OF THE APPROACH SURFACE DRAWINGS FOR DETAILS ON ANY CLOSE-IN OBSTRUCTIONS TO THE RUNWAY APPROACH, PRIMARY, AND TRANSITIONAL SURFACES AS WELL AS RUNWAY DATA AND PENETRATIONS TO OTHER CRITICAL SURFACES.
 - ALL OBSTRUCTIONS SHOULD BE EITHER LIGHTED OR REMOVED.
 - CFR TITLE 14, PART 77 REQUIRES THAT A FAA 7460-1 FORM BE SUBMITTED FOR ANY CONSTRUCTION OR ALTERATION WITHIN 20,000 FEET OF THE CLOSEST POINT OF THE RUNWAY WHICH PENETRATES A SLOPE OF 100° (H):1° (V).
 - BASE MAPS TAKEN FROM USGS 7.5 MINUTE SERIES QUADS:
BEACH, VA 1994
BON AIR, VA 1994
DREWRY'S BLUFF, VA 1994
CHESTER, VA 1996
CHESTERFIELD, VA 1994
HALLSBORO, VA 1994
 - ALL 14 CFR PART 77 SURFACES DEPICTED REPRESENT THE ULTIMATE AIRPORT DEVELOPMENT PLAN.
 - THE CODE OF CHESTERFIELD COUNTY, VA, SECTION 19-507 LISTS HEIGHT LIMITATIONS ESTABLISHED AS OVERLAY ZONES AS THEY APPLY TO FCI.
 - LEGEND ELEMENTS REPRESENT DEPICTIONS ON DRAWING BUT MAY VARY IN SIZE DUE TO SCALING ON DRAWING.



NO.	REVISIONS	BY	APP.	DATE

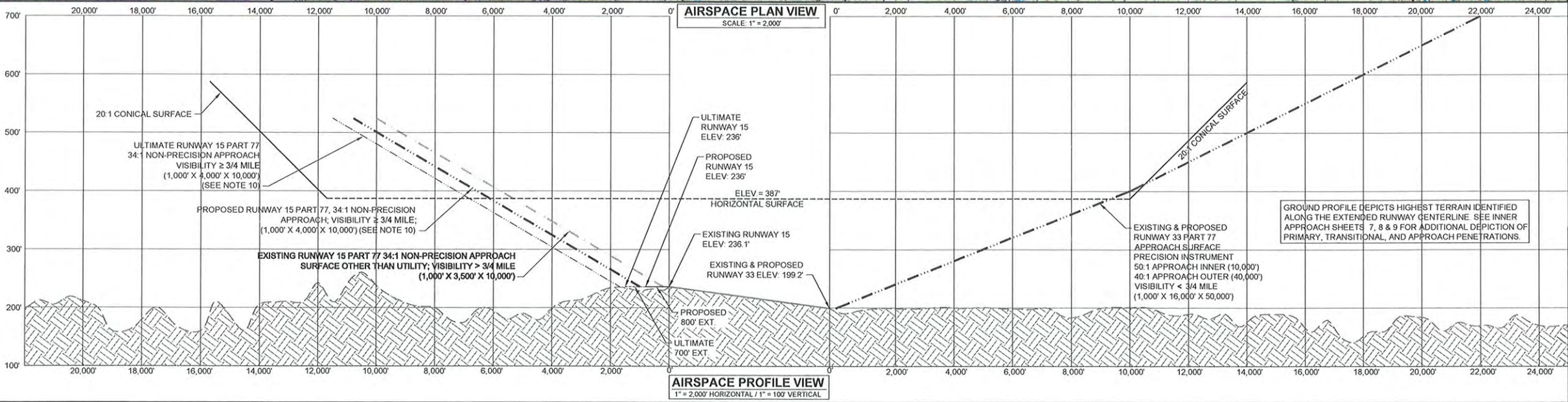
AIRPORT AIRSPACE DRAWING

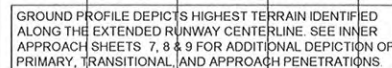
CHESTERFIELD COUNTY AIRPORT
RICHMOND, VIRGINIA

DELTA AIRPORT CONSULTANTS, INC.
www.deltaairport.com

SHEET 5 OF 13

DRAWN BY: DWS/LKH **SCALE:** 1" = 2000'
CHECKED BY: CMC **DATE:** NOVEMBER 2011





- ## NOTES

- 2000 0 2000 4000
SCALE: 1"=2000' FEET

AIRPORT AIRSPACE DRAWING

CHESTERFIELD COUNTY AIRPORT
RICHMOND, VIRGINIA



DRAWN BY:	DWS/LKH	SCALE:	1" = 200'
CHECKED BY:	CMC	DATE:	NOVEMBER 2011

SHEET
6
OF
13

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DRAWING: 061311as.dwg LAYOUT: RW15

DATE: 06/13/2012 BY: JKL

SCALE: 1"=200'

PROJECT: DELTA AIRPORT

DATE: 06/13/2012

BY: JKL

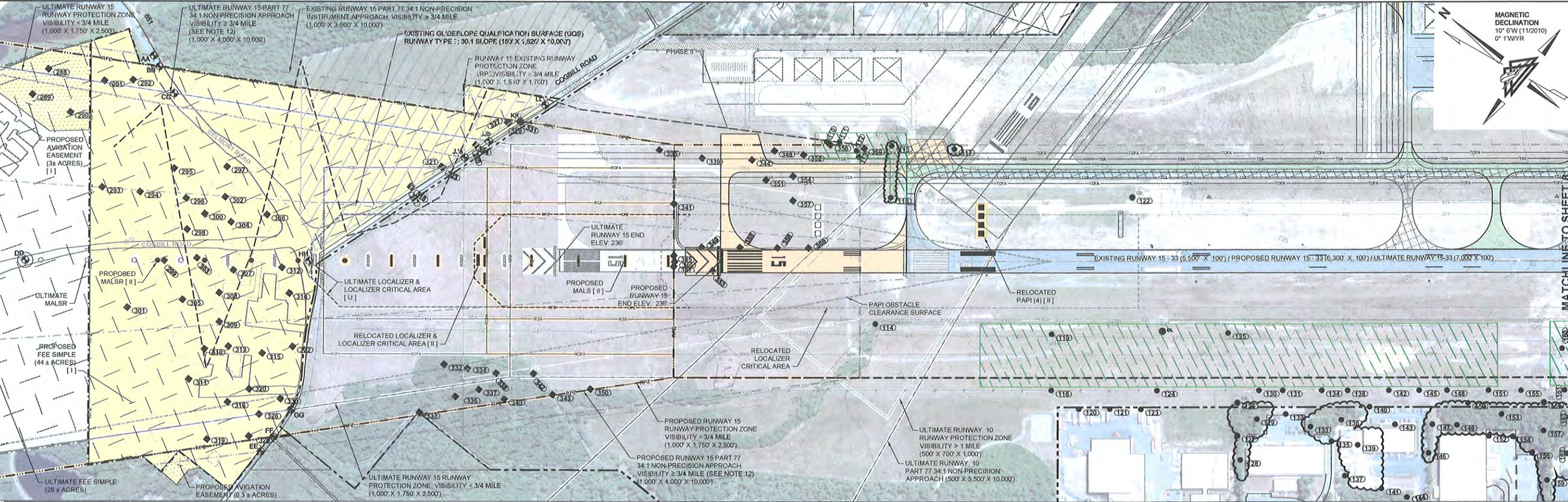
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PROJECT: DELTA AIRPORT

DATE: 06/13/2012

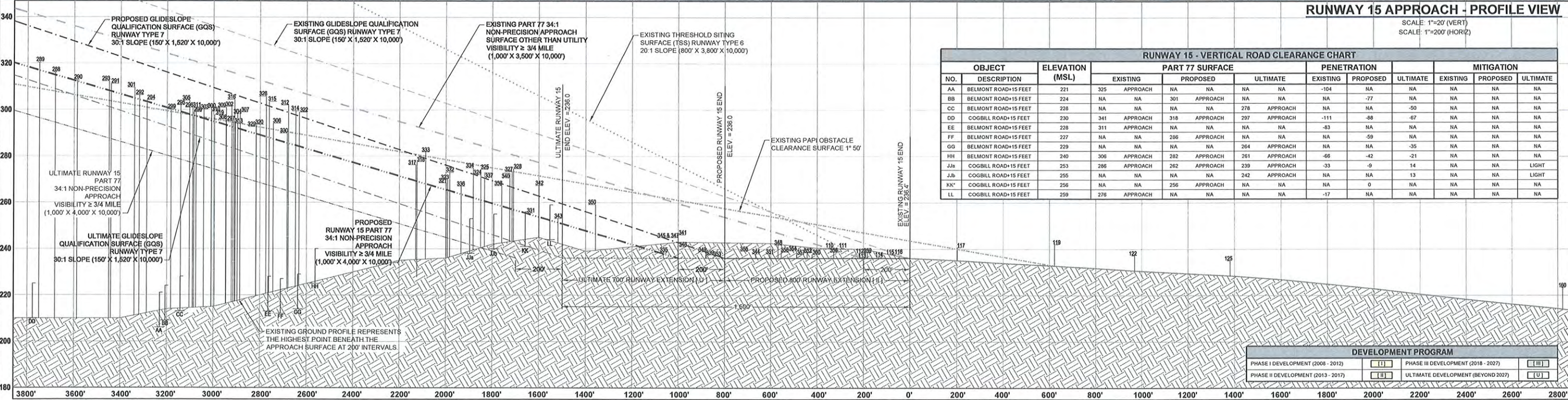
BY: JKL

SCALE: 1"=200'



RUNWAY 15 APPROACH - PROFILE VIEW

SCALE: 1"=20' (VERT)
SCALE: 1"=200' (HORIZ)



RUNWAY 15 - VERTICAL ROAD CLEARANCE CHART											
NO.	OBJECT	ELEVATION (MSL)	PART 77 SURFACE			PENETRATION		MITIGATION			
			EXISTING	PROPOSED	ULTIMATE	EXISTING	PROPOSED	EXISTING	PROPOSED	ULTIMATE	
AA	BELMONT ROAD+15 FEET	221	325	APPROACH	NA	NA	NA	NA	NA	NA	NA
BB	BELMONT ROAD+15 FEET	224	NA	NA	301	APPROACH	NA	NA	NA	NA	NA
CC	BELMONT ROAD+15 FEET	228	NA	NA	NA	278	APPROACH	NA	NA	NA	NA
DD	COGBILL ROAD+15 FEET	230	341	APPROACH	318	APPROACH	297	APPROACH	NA	NA	NA
EE	BELMONT ROAD+15 FEET	228	311	APPROACH	NA	NA	NA	NA	NA	NA	NA
FF	BELMONT ROAD+15 FEET	227	NA	NA	286	APPROACH	NA	NA	NA	NA	NA
GG	BELMONT ROAD+15 FEET	229	NA	NA	NA	264	APPROACH	NA	NA	NA	NA
HH	BELMONT ROAD+15 FEET	240	308	APPROACH	282	APPROACH	261	APPROACH	NA	NA	NA
JJA	COGBILL ROAD+15 FEET	253	286	APPROACH	262	APPROACH	239	APPROACH	-33	-9	14
JJB	COGBILL ROAD+15 FEET	255	NA	NA	NA	NA	242	APPROACH	NA	NA	13
KK	COGBILL ROAD+15 FEET	256	NA	NA	256	APPROACH	NA	NA	NA	NA	0
LL	COGBILL ROAD+15 FEET	259	276	APPROACH	NA	NA	NA	NA	NA	NA	-17

DEVELOPMENT PROGRAM			
PHASE I DEVELOPMENT (2008 - 2012)	[I]	PHASE III DEVELOPMENT (2018 - 2027)	[III]
PHASE II DEVELOPMENT (2013 - 2017)	[II]	ULTIMATE DEVELOPMENT (BEYOND 2027)	[U]

LEGEND			
EXISTING	DESCRIPTION	PROPOSED	ULTIMATE
[Symbol]	OBSTRUCTION	[Symbol]	NA
[Symbol]	OBSTRUCTION GROUP	[Symbol]	NA
[Symbol]	RUNWAY SAFETY AREA	[Symbol]	NA
[Symbol]	RUNWAY OBJECT FREE AREA	[Symbol]	NA
[Symbol]	RUNWAY PROTECTION ZONE	[Symbol]	NA
[Symbol]	OBJECT FREE ZONE	[Symbol]	NA
[Symbol]	UTILITY EASEMENT	[Symbol]	NA
[Symbol]	AIRPORT PROPERTY LINE	[Symbol]	NA
[Symbol]	14 CFR PART 77 SURFACE	[Symbol]	NA
[Symbol]	CRITICAL COMPOSITE PROFILE	[Symbol]	NA
[Symbol]	GLIDESLOPE QUALIFICATION SURFACE	[Symbol]	NA
[Symbol]	THRESHOLD SITING SURFACE	[Symbol]	NA
[Symbol]	PAPI CLEARANCE SURFACE	[Symbol]	NA

LEGEND			
EXISTING	DESCRIPTION	PROPOSED	ULTIMATE
[Symbol]	TERRAIN (PROFILE VIEW)	[Symbol]	NA
[Symbol]	AVIGATION EASEMENT	[Symbol]	NA
[Symbol]	FEE SIMPLE ACQUISITION	[Symbol]	NA
[Symbol]	TERRAIN OBSTRUCTION	[Symbol]	NA
[Symbol]	WETLAND AREAS	[Symbol]	NA
[Symbol]	VERTICAL ROAD / RAILROAD CLEARANCE	[Symbol]	NA
[Symbol]	OBSTRUCTION LIGHT	[Symbol]	NA

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 - OBSTRUCTIONS NOT EVALUATED FOR ULTIMATE DEVELOPMENT BEYOND 20-YEAR PLANNING PERIOD.
 - LEGEND ELEMENTS REPRESENT DEPICTIONS ON DRAWING BUT MAY VARY IN SIZE DUE TO SCALING ON DRAWING.

200 0 200 400
SCALE: 1"=200'
FEET

NO.	REVISIONS	BY	APP.	DATE

RUNWAY 15 INNER APPROACH

CHESTERFIELD COUNTY AIRPORT
RICHMOND, VIRGINIA

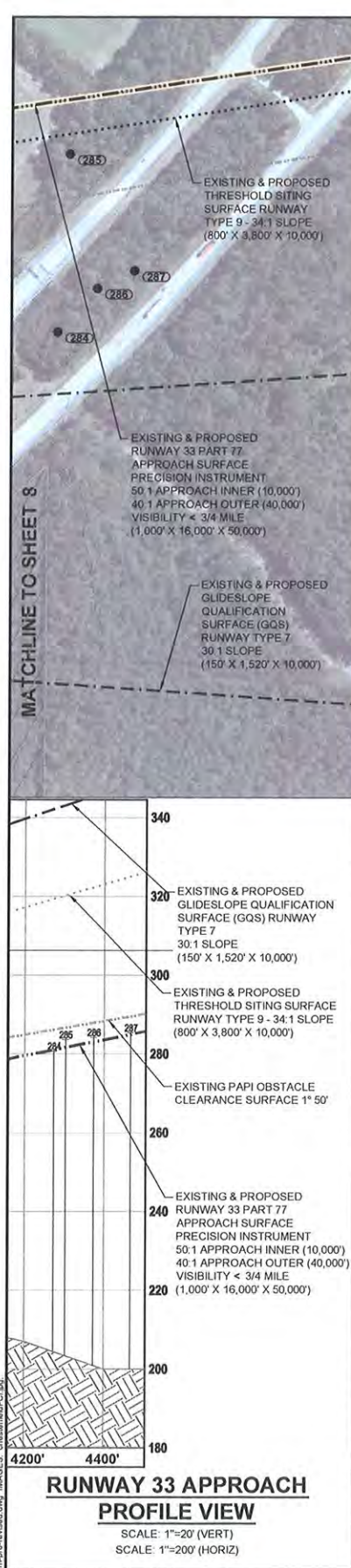


DRAWN BY: DWS/LKH
CHECKED BY: RGL
SCALE: AS SHOWN
DATE: NOVEMBER 2011

SHEET
7
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13

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LEGEND			
EXISTING	DESCRIPTION	PROPOSED	ULTIMATE
	OBSTRUCTION		NA
	OBSTRUCTION GROUP		NA
	RUNWAY SAFETY AREA		NA
	RUNWAY OBJECT FREE AREA		NA
	RUNWAY PROTECTION ZONE		NA
	OBJECT FREE ZONE		NA
	UTILITY EASEMENT		NA
	AIRPORT PROPERTY LINE		NA
	14 CFR PART 77 SURFACE		NA
	CRITICAL COMPOSITE PROFILE		NA
	GLIDESLOPE QUALIFICATION SURFACE		NA
	THRESHOLD SITING SURFACE		NA
	PAPI CLEARANCE SURFACE		NA

LEGEND			
EXISTING	DESCRIPTION	PROPOSED	ULTIMATE
	TERRAIN (PROFILE VIEW)		NA
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	FEE SIMPLE ACQUISITION		NA
	WETLAND OBSTRUCTION		NA
	WETLAND AREAS		NA
	VERTICAL ROAD / RAILROAD CLEARANCE		NA
	OBSTRUCTION LIGHT		NA

* AIRSIDE SURVEY MAP ACCURACY INSUFFICIENT TO VERTICAL CLEARANCE AT POINT OF "X". GROUND SURVEYS DURING PRELIMINARY DESIGN ARE REQUIRED TO DETERMINE ELEVATION OFF PROPOSED RUNWAY 15 THRESHOLD.

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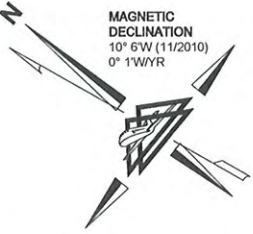
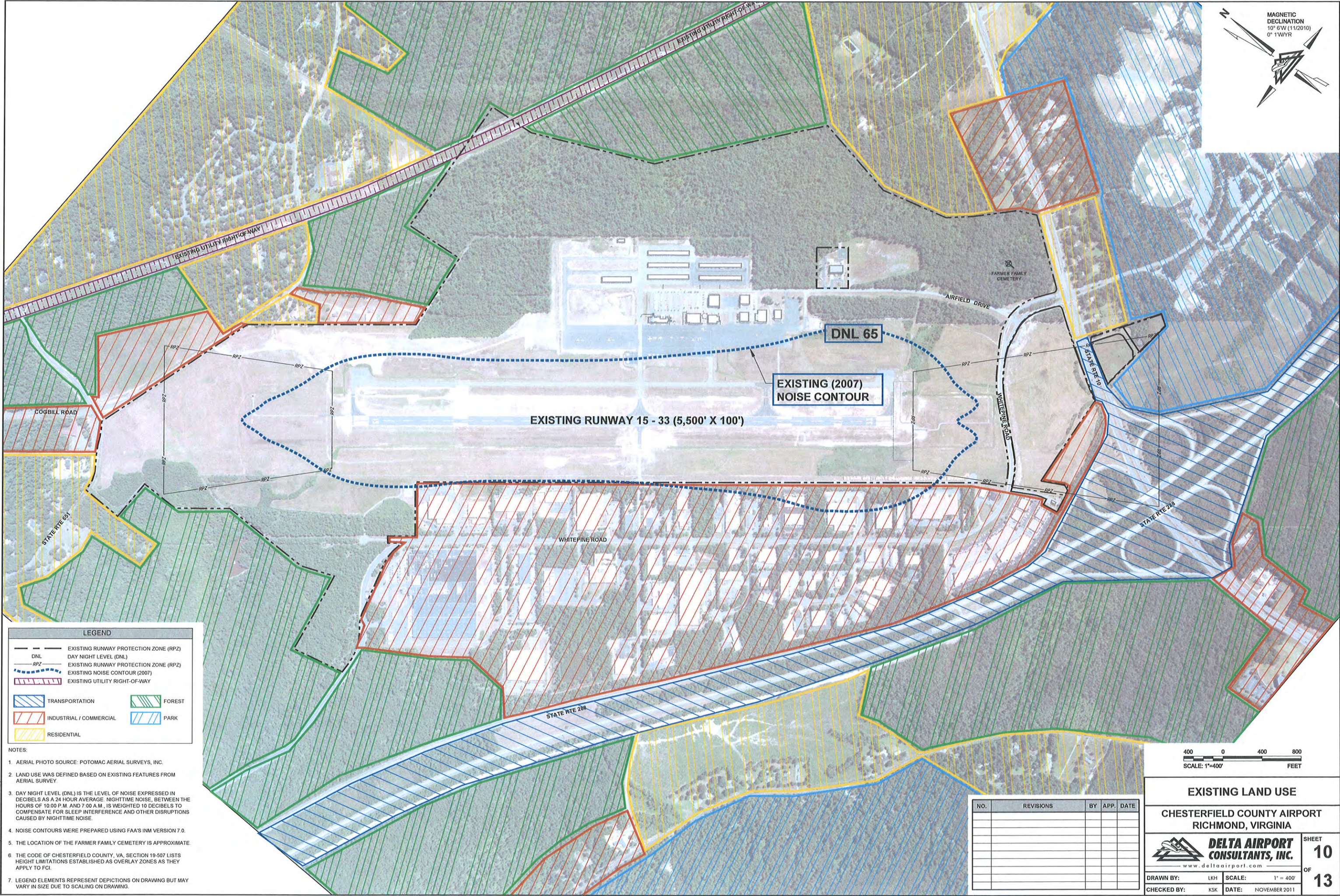
INNER APPROACH TABLES			
CHESTERFIELD COUNTY AIRPORT RICHMOND, VIRGINIA			
www.deltairport.com			
DRAWN BY:	LKH	SCALE:	AS SHOWN
CHECKED BY:	RGL	DATE:	NOVEMBER 2011

SHEET **9** OF **13**

OBSTRUCTION CHART									
OBJECT		TOP ELEV	PART 77 SURFACE		PENETRATION		MITIGATION		
NO.	DESCRIPTION		EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	
110	TERRAIN	241	240	APPROACH	NA	1	NA	GRADE AS REQ.	NA
111	TERRAIN	240	238	APPROACH	NA	2	NA	GRADE AS REQ.	NA
112	TERRAIN	238	236	APPROACH	NA	2	NA	GRADE AS REQ.	NA
113	TERRAIN	236	235	APPROACH	NA	1	NA	GRADE AS REQ.	NA
114	TREE	237	236	PRIMARY	NA	1	NA	REMOVE	NA
115	TREE	238	236	PRIMARY	NA	2	NA	REMOVED	NA
116	TREE	238	236	PRIMARY	NA	2	NA	REMOVED	NA
117	TREE	241	235	PRIMARY	NA	6	NA	REMOVE	NA
118	FENCE	242	241	TRANSITIONAL	NA	1	NA	LIGHTED	NA
119	VALVE	242	233	PRIMARY	NA	9	NA	LIGHT	NA
120	POLE	260	256	TRANSITIONAL	NA	4	NA	LIGHTED	NA
121	POLE	261	252	TRANSITIONAL	NA	9	NA	LIGHTED	NA
122	OBST. LIGHT	237	231	PRIMARY	NA	6	NA	NA	NA
123	POLE	263	253	TRANSITIONAL	NA	10	NA	LIGHTED	NA
124	FENCE	243	238	TRANSITIONAL	NA	5	NA	LIGHTED	NA
125	POST	235	238	PRIMARY	NA	7	NA	LIGHT	NA
126	OBST. LIGHT	290	239	TRANSITIONAL	NA	51	NA	NA	NA
127	TREE	264	263	TRANSITIONAL	NA	1	NA	LIGHTED	NA
128	TREE	301	293	TRANSITIONAL	NA	8	NA	LIGHTED	NA
129	TREE	266	260	TRANSITIONAL	NA	26	NA	LIGHTED	NA
130	FENCE	238	237	TRANSITIONAL	NA	1	NA	LIGHTED	NA
131	FENCE	240	236	TRANSITIONAL	NA	4	NA	LIGHTED	NA
132	POLE	260	247	TRANSITIONAL	NA	13	NA	LIGHTED	NA
133	TREE	278	259	TRANSITIONAL	NA	19	NA	LIGHTED	NA
134	FENCE	238	233	TRANSITIONAL	NA	5	NA	LIGHTED	NA
135	TREE	264	263	TRANSITIONAL	NA	1	NA	LIGHTED	NA
136	TREE	290	253	TRANSITIONAL	NA	37	NA	LIGHTED	NA
137	TREE	290	270	TRANSITIONAL	NA	20	NA	LIGHTED	NA
138	FENCE	238	233	TRANSITIONAL	NA	5	NA	LIGHTED	NA
139	CRANE	356	354	TRANSITIONAL	NA	2	NA	TEMPORARY	NA
140	TREE	243	241	TRANSITIONAL	NA	2	NA	LIGHTED	NA
141	TREE	295	289	TRANSITIONAL	NA	6	NA	LIGHTED	NA
142	FENCE	235	230	TRANSITIONAL	NA	5	NA	LIGHTED	NA
143	POLE	253	251	TRANSITIONAL	NA	2	NA	LIGHTED	NA
144	TREE	298	294	TRANSITIONAL	NA	4	NA	LIGHTED	NA
145	FENCE	232	228	TRANSITIONAL	NA	4	NA	LIGHTED	NA
146	TREE	267	269	TRANSITIONAL	NA	18	NA	LIGHTED	NA
147	TREE	278	241	TRANSITIONAL	NA	37	NA	LIGHTED	NA
148	FENCE	232	228	TRANSITIONAL	NA	4	NA	LIGHTED	NA
149	TREE	290	248	TRANSITIONAL	NA	42	NA	LIGHTED	NA
150	TREE	235	234	TRANSITIONAL	NA	1	NA	LIGHTED	NA
151	FENCE	230	229	TRANSITIONAL	NA	1	NA	LIGHTED	NA
152	TANK	271	236	TRANSITIONAL	NA	35	NA	LIGHTED	NA
153	TREE	281	240	TRANSITIONAL	NA	41	NA	LIGHTED	NA
154	TREE	253	252	TRANSITIONAL	NA	1	NA	LIGHTED	NA
155	FENCE	225	223	TRANSITIONAL	NA	2	NA	LIGHTED	NA
156	TREE	262	261	TRANSITIONAL	NA	1	NA	LIGHTED	NA
157	TREE	292	260	TRANSITIONAL	NA	32	NA	LIGHTED	NA
158	OBST. LIGHT	261	190	TRANSITIONAL	NA	91	NA	LIGHTED	NA
159	TREE	288	287	TRANSITIONAL	NA	1	NA	NA	NA
160	BLOCK_PILE	223	214	PRIMARY	NA	9	NA	REMOVE	NA
161	GATE	226	220	TRANSITIONAL	NA	6	NA	LIGHTED	NA
162	TREE	289	280	TRANSITIONAL	NA	9	NA	LIGHTED	NA
163	TREE	278	252	TRANSITIONAL	NA	26	NA	LIGHTED	NA
164	TREE	277	276	TRANSITIONAL	NA	1	NA	LIGHTED	NA
165	TREE	282	266	TRANSITIONAL	NA	16	NA	LIGHTED	NA
166	TREE	281	244	TRANSITIONAL	NA	37	NA	LIGHTED	NA
167	GATE	225	116	TRANSITIONAL	NA	109	NA	LIGHTED	NA
168	TREE	267	266	TRANSITIONAL	NA	1	NA	LIGHTED	NA
169	FENCE	223	218	TRANSITIONAL	NA	5	NA	NA	NA
170	OBST. LIGHT	238	233	TRANSITIONAL	NA	5	NA	NONE	NA
171	TREE	295	251	TRANSITIONAL	NA	44	NA	LIGHTED	NA
172	TREE	267	246	TRANSITIONAL	NA	41	NA	LIGHTED	NA
173	TREE	296	261	TRANSITIONAL	NA	37	NA	LIGHTED	NA
174	TREE	267	266	TRANSITIONAL	NA	1	NA	NONE	NA
175	OBST. LIGHT	225	222	TRANSITIONAL	NA	3	NA	NA	NA
176	FENCE	222	219	TRANSITIONAL	NA	3	NA	LIGHTED	NA
177	TREE	264	247	TRANSITIONAL	NA	37	NA	LIGHTED	NA
178	FENCE	219	216	TRANSITIONAL	NA	3	NA	LIGHTED	NA
179	TREE	262	249	TRANSITIONAL	NA	33	NA	LIGHTED	NA
180	TREE	268	271	TRANSITIONAL	NA	17	NA	LIGHTED	NA
181	TREE	281	264	TRANSITIONAL	NA	17	NA	LIGHTED	NA
182	FENCE	218	215	TRANSITIONAL	NA	3	NA	LIGHTED	NA
183	TREE	276	260	TRANSITIONAL	NA	18	NA	LIGHTED	NA
184	TREE	283	248	TRANSITIONAL	NA	35	NA	LIGHTED	NA
185	TREE	264	259	TRANSITIONAL	NA	25	NA	LIGHTED	NA
186	FENCE	216	215	TRANSITIONAL	NA	1	NA	LIGHTED	NA
187	TREE	262	235	TRANSITIONAL	NA	27	NA	LIGHTED	NA
188	TREE	264	242	TRANSITIONAL	NA	22	NA	LIGHTED	NA
189	FENCE	214	213	TRANSITIONAL	NA	1	NA	LIGHTED	NA
190	TREE	240	231	TRANSITIONAL	NA	9	NA	LIGHTED	NA
191	TREE	273	262	TRANSITIONAL	NA	11	NA	LIGHTED	NA
192	TREE	276	239	TRANSITIONAL	NA	37	NA	LIGHTED	NA
193	TREE	273	233	TRANSITIONAL	NA	40	NA	LIGHTED	NA
194	TREE	271	263	TRANSITIONAL	NA	8	NA	LIGHTED	NA
195	TREE	281	259	TRANSITIONAL	NA	22	NA	LIGHTED	NA
196	TREE	268	270	TRANSITIONAL	NA	16	NA	LIGHTED	NA
197	TREE	231	220	TRANSITIONAL	NA	11	NA	LIGHTED	NA
198	TREE	277	245	TRANSITIONAL	NA	32	NA	LIGHTED	NA

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DRAWING: 06131-elldwg LAYOUT: 24x36
PLOTS: 06131-elldwg PLOTS: 06131-elldwg



MAGNETIC
DECLINATION
10° 5' W (11/2010)
0° 1' W/YR

LEGEND

EXISTING RUNWAY PROTECTION ZONE (RPZ)

DNL

DAY NIGHT LEVEL (DNL)

RPZ

EXISTING RUNWAY PROTECTION ZONE (RPZ)

EXISTING NOISE CONTOUR (2007)

EXISTING UTILITY RIGHT-OF-WAY

TRANSPORTATION

INDUSTRIAL / COMMERCIAL

RESIDENTIAL

FOREST

PARK

- NOTES:
1. AERIAL PHOTO SOURCE: POTOMAC AERIAL SURVEYS, INC.
 2. LAND USE WAS DEFINED BASED ON EXISTING FEATURES FROM AERIAL SURVEY.
 3. DAY NIGHT LEVEL (DNL) IS THE LEVEL OF NOISE EXPRESSED IN DECIBELS AS A 24 HOUR AVERAGE. NIGHTTIME NOISE, BETWEEN THE HOURS OF 10:00 P.M. AND 7:00 A.M., IS WEIGHTED 10 DECIBELS TO COMPENSATE FOR SLEEP INTERFERENCE AND OTHER DISRUPTIONS CAUSED BY NIGHTTIME NOISE.
 4. NOISE CONTOURS WERE PREPARED USING FAA'S INM VERSION 7.0.
 5. THE LOCATION OF THE FARMER FAMILY CEMETERY IS APPROXIMATE.
 6. THE CODE OF CHESTERFIELD COUNTY, VA, SECTION 19-507 LISTS HEIGHT LIMITATIONS ESTABLISHED AS OVERLAY ZONES AS THEY APPLY TO FCI.
 7. LEGEND ELEMENTS REPRESENT DEPICTIONS ON DRAWING BUT MAY VARY IN SIZE DUE TO SCALING ON DRAWING.

NO.	REVISIONS	BY	APP.	DATE

4000400800

SCALE: 1"=400'

FEET

EXISTING LAND USE

CHESTERFIELD COUNTY AIRPORT

RICHMOND, VIRGINIA

**DELTA AIRPORT
CONSULTANTS, INC.**

www.deltaairport.com

DRAWN BY: LKH

CHECKED BY: KSK

SCALE: 1" = 400'

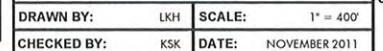
DATE: NOVEMBER 2011

SHEET

10

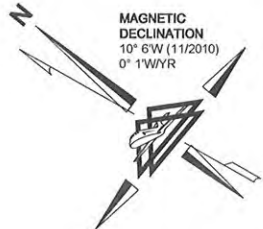
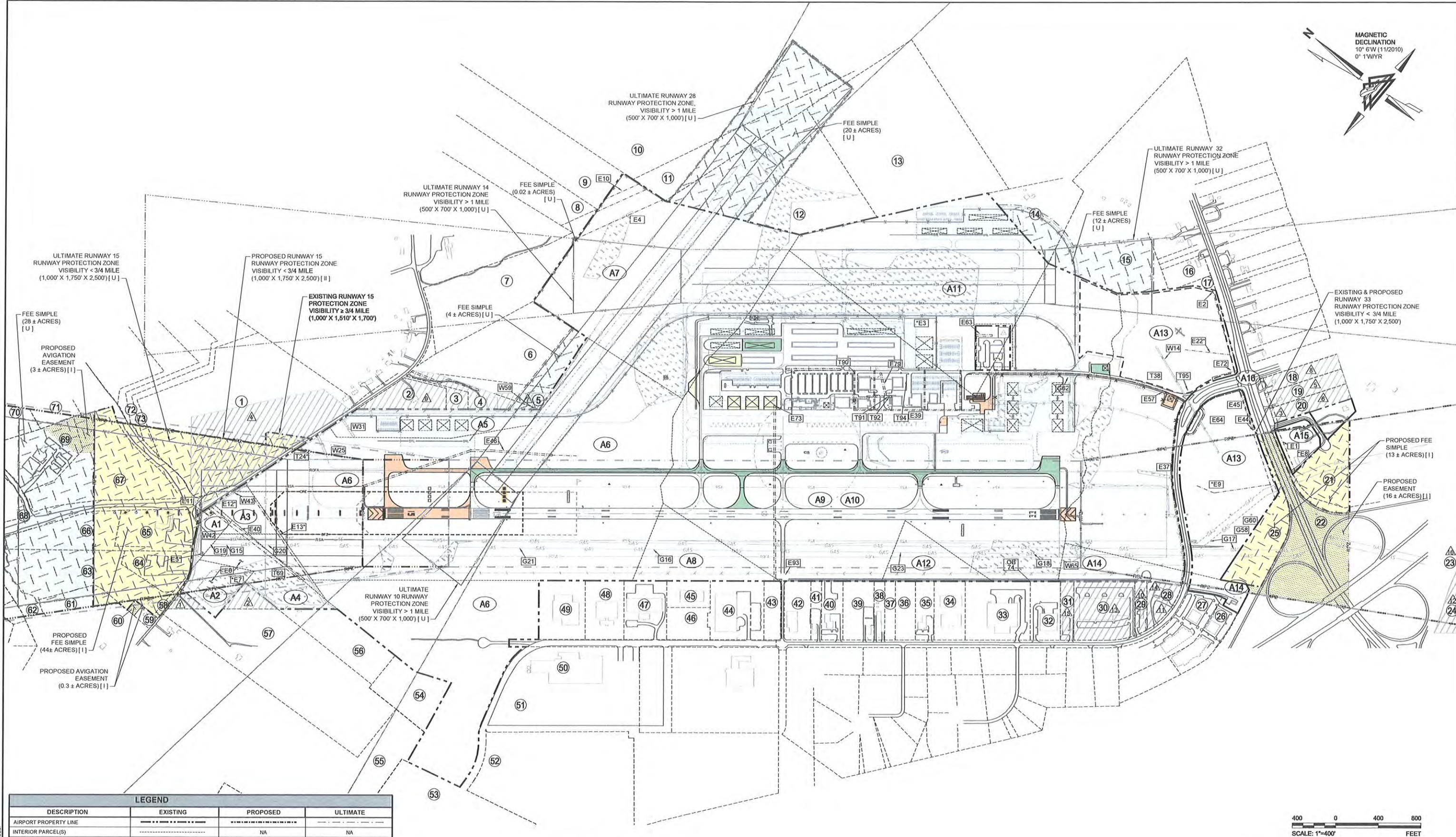
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13



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DRAWING: 06131-apm.dwg, LAYOUT: 24x36
PLOT: 06131-apm.dwg, LAYOUT: 24x36, 3/9/2012 2:09:54 PM, dws



MAGNETIC DECLINATION
10° 6' W (11/2010)
0° 1' WYR

LEGEND			
DESCRIPTION	EXISTING	PROPOSED	ULTIMATE
AIRPORT PROPERTY LINE	---	---	---
INTERIOR PARCEL(S)	---	NA	NA
ADJACENT PARCEL(S)	---	NA	NA
UTILITY EASEMENT (ELECTRIC)	---	NA	NA
UTILITY EASEMENT (GAS)	---	NA	NA
UTILITY EASEMENT (WATER)	---	NA	NA
PRIMARY SURFACE	---	---	---
PAVEMENT	---	---	---
RUNWAY PROTECTION ZONE (RPZ)	---	RPZ	RPZ
RUNWAY SAFETY AREA (RSA)	---	RSA	RSA
RUNWAY OBJECT FREE AREA (ROFA)	---	ROFA	ROFA
FENCE	---	---	---
AVIGATION EASEMENT	---	---	NA
FEE SIMPLE LAND ACQUISITION	NA	---	---
AIRPORT BUILDINGS	---	---	---

- NOTES**
- AIRPORT PROPERTY LINE AND ADJACENT OWNER INFORMATION IS BASED UPON A BOUNDARY SURVEY PROVIDED BY PRECISION MEASUREMENTS, INC., DATED OCTOBER 2008 AND CHESTERFIELD COUNTY, VA GIS (2010).
 - SEE THE NEXT SHEET (13 OF 13 "AIRPORT PROPERTY MAP TABLES") FOR COORDINATING PROPERTY OWNER AND EASEMENT INFORMATION NOTED ABOVE.
 - (*) DENOTES NON-DESCRIPTIVE EASEMENT. LOCATIONS DESIGNATED BY THE FOLLOWING:
* THE CHESAPEAKE AND POTOMAC TELEPHONE OF VIRGINIA
* VIRGINIA ELECTRIC AND POWER COMPANY.
 - LEGEND ELEMENTS REPRESENT DEPICTIONS ON DRAWING BUT MAY VARY IN SIZE DUE TO SCALING ON DRAWING.

PARCEL / EASEMENT LEGEND

(A1) = INTERIOR PARCEL
(7) = ADJACENT PARCEL
△ = EXISTING EASEMENT
G16 = EXISTING ENCUMBRANCE

SEE "EXISTING ENCUMBRANCE TABLE"
E = ELECTRICAL
G = GAS
OB = OBSTRUCTION TOWER
T = TELEPHONE
W = WATER

AIRPORT DEVELOPMENT PROGRAM	
PHASE I DEVELOPMENT (2008 - 2012)	(I)
PHASE II DEVELOPMENT (2013 - 2017)	(II)
PHASE III DEVELOPMENT (2018 - 2027)	(III)
ULTIMATE DEVELOPMENT (BEYOND 2027)	(U)

NO.	REVISIONS	BY	APP.	DATE

400 0 400 800
SCALE: 1"=400' FEET

AIRPORT PROPERTY MAP

CHESTERFIELD COUNTY AIRPORT
RICHMOND, VIRGINIA

 **DELTA AIRPORT CONSULTANTS, INC.**
www.deltaairport.com

DRAWN BY: LKH SCALE: 1" = 400'
CHECKED BY: RGL DATE: NOVEMBER 2011

SHEET
12
OF
13

1

A. INTRODUCTION

This chapter describes the recommended Chesterfield County Airport (FCI) Capital Improvement Program (CIP) for the 20-year planning horizon. It identifies probable construction costs, in constant 2010 dollars, and establishes a preliminary funding scenario for each recommended project. Projects are presented in three development phases: Phase I (0-5 years), Phase II (6-10 years), and Phase III (11-20 years).

The budget data provided herein represents an order of magnitude estimate of the total project cost, including construction and additional expenses such as engineering, administration, surveying, and testing. These are preliminary estimates for planning purposes; it should be noted that more detailed cost estimates must be developed prior to the implementation of a project in order to ensure that sufficient funding is available to complete the identified scope of work. To this end, project cost estimates should be periodically reviewed and updated to reflect annual inflation and other changing conditions.

Major project categories are offered for each development phase in Section D of this chapter. Projects are depicted on the Airport Layout Plan (ALP) drawing. The recommended phasing plan should be evaluated periodically and adjusted accordingly to reflect changes in demand, local priorities, economic conditions, and/or availability of funding.

B. FUNDING SOURCES

1. Federal Aviation Administration (FAA) Funds

The principal source of federal funding for airport capital development is through the Airport Improvement Program (AIP). This program was initially authorized in 1992 and



has been periodically re-authorized since that date. In February 2012, FAA Reauthorization Legislation was signed into law as the FAA Modernization and Reform Act of 2012. This act provides grant funds specifically for general aviation airports listed in the latest published National Plan of Integrated Airports (NPIAS), generally publicly owned airports that have documented airfield development needs.

The funding for the Airport Improvement Program Trust Fund occurs through a flight segment tax and airline ticket tax, a tax on cargo waybills, an international departure fee, and a per gallon tax on general aviation fuel and jet fuel. FAA Order 5100.38, *Airport Improvement Program (AIP) Handbook*, as amended, defines project eligibility. In general, airfield improvements and airfield safety and security equipment, airport ground access, public use areas of the terminal, land acquisition for eligible airport facilities, runway protection zones, and certain noise mitigation purposes are eligible. Airport master planning is also eligible. Eligible projects at FCI receive 90 percent funding participation from the FAA.

Generally, revenue-producing space and facility developments for parking, car rental, concession space, private tenant hangars, and so forth, are not eligible. In order for the development to be eligible, the airport must currently be included as an approved airport in the NPIAS and the eligible projects must be included in the airport's FAA-approved Airport Layout Plan. The entitlement may be used in the fiscal year it becomes available and the next two fiscal years. An airport may choose to delay using their entitlement the first or second year and use the accrued money in the third year to fund a larger project. The fund availability expires if not under grant for a project three years after accrual.

2. Virginia Department of Aviation (DOAV) Funds

Funding for airport improvements by the Commonwealth of Virginia is administered by the Virginia Department of Aviation (DOAV) as authorized by the Virginia Aviation Board (VAB). Similar to the Federal Aviation Trust Fund, DOAV funds are derived



from user fees (i.e. aircraft fuel taxes and state sales tax on aircraft). On a larger scale, a percentage of gasoline taxes are assigned to funding for aviation infrastructure development.

Immediately following the signing of the FAA Modernization and Reform Act of 2012, the VAB adopted a policy change that increased the state's funding portion for federally funded projects from 60 percent to 80 percent of the non-federal share when state discretionary funds are involved. Therefore, the local share of such projects remains at two percent. The funding structure is now 90 percent federal funds, eight percent state funds, and two percent local funds.

When an airport sponsor is not eligible for federal funds, or federal funds are not available for an eligible sponsor, the VAB may allocate state discretionary funds to projects. The participation rate varies depending on the type of project. For most state funded projects, the state participation is 80 percent of the eligible project costs.

3. Local Funds

Airports have the ability to fund capital projects from surplus revenues generated at the airport, funds generated through the issuance of airport bonds, and public infrastructure or development funds provided by, or to, the local government operator of the airport.

4. Other Capital Funds

The balance of funding to be provided for implementation of the airport's CIP would be private investment for projects, assumed to be provided by airport tenants or third party investors. These privately funded projects are typically reserved for non-eligible items including revenue-producing space and facility developments for parking, concession space, car rental, and private tenant hangars.



C. AIRPORT DEVELOPMENT PROGRAM

This section identifies the projects and associated timeline required for the continued improvement and operation of FCI during the 20-year planning period. The projects are listed by phase (time period), estimated cost, funding service, and estimated AIP eligibility. Estimated costs include design and engineering fees and a project contingency and are intended only to identify "order of magnitude of costs" for planning purposes. Changes in airport operations or demand, implementation priorities, funding availability, or economic conditions may alter the need or timing of the proposed development.

The cost estimates presented in this section are intended to provide a basis for development of the Airport Capital Improvement Plan (ACIP). The ACIP is a need based five year plan of funding for airport planning and development projects.

Projects are ranked nationally in priority to accomplish the following objectives:

1. Preserve existing airport infrastructure,
2. Mitigate noise and other environmental effects,
3. Achieve compliance with design standards, and
4. Increase airport system capacity.

The FAA uses a numerical system as one tool for prioritizing airport development projects. The values generated by the National Priority System (NPS) equation categorize the projects in accordance with agency goals and objectives. The NPS generates values between 0 and 100, with 100 generally being most consistent with agency goals. Additional information on ACIP development is available in FAA Order 5100.39A, Airports Capital Improvement Plan (see **Appendix K**).

The current estimated cost of each phase and the total cost of the program are as follows:

- Phase I - \$15 million
- Phase II - \$8 million



- Phase III - \$5 million
- Total - \$28 million

1. Phase I Development

Phase I of the airport development program is focused on correcting non-standard conditions and preparing the environmental coordination necessary for future construction. Phase I also includes the construction of facilities recommended in Chapter Four, Facility Requirements.

Implementation of Phase I projects is highlighted in **Table 8-1** by fiscal year phasing. The Environmental Assessment (EA) and resulting funding is required prior to initiating the key action steps toward construction. Land acquisition covers two levels of activity; first the services involving survey, appraisal, review appraisal, Environmental Due Diligence Audit (EDDA) – if applicable, negotiation services, and secondly, final settlement of the purchases. Wetland mitigation would then be pursued with obstruction removal. The remaining Phase I projects are not elements of a critical path project and would be pursued at the County's discretion or as demand warrants.

The AIP eligible projects within Phase I should compete well in the NPS. The environmental assessment and subsequent obstruction removal and wetland mitigation each should rank in the top 40 percentile. Land acquisition will be a mid-range rankings, with the taxiway turnout and hold apron ranked lowest of the eligible projects. Ranking of the projects identified by the FAA as an individual work item within the multi-year runway extension project will be given the same priority rating as the overall runway project and thus may be ranked lower than if they were justified as standalone projects.

The total estimated cost for Phase I development, is approximately \$15 million. Phase I development estimates, complete with potential funding sources, are presented in **Table 8-1**.



2. Phase II Development

Phase II of the planning period is focused on extending the runway and enhancing all-weather operational capability through reduced visibility minima.

The implementation strategy for Phase II projects (specifically toward the runway extension) would initiate with project design and then follow in sequence of the projects as listed in **Table 8-2**.

The AIP eligible projects within Phase II will likely be in the mid-range rankings as most are associated with the proposed runway extension. Ranking of the projects identified by the FAA as an individual work item within the multi-year runway extension project will be given the same priority rating as the overall runway project and thus may be ranked lower than if they were justified as standalone projects.

The probable development costs for Phase II total approximately \$8 million. Phase II development estimates and potential funding sources are presented in **Table 8-2**.

3. Phase III Development

Phase III of the planning period includes actions to address non-standard conditions and the development of facilities recommended for the future growth of the airport.

The implementation strategy for Phase III project would be at County discretion or as demand warrants as they are not elements of a critical path project.

The AIP eligible project within Phase III, relocation of the parallel taxiway, will likely be in the mid-range rankings as the project is standards driven.



The probable development costs for Phase III total approximately \$5 million. Phase III development estimates and potential funding sources are presented in **Table 8-3**.

D. SUMMARY

The ALP depicts approximately \$28 million in future airport improvements required to accommodate the existing and future aviation demand for the 20-year planning period. The estimated funding sources for the program are as follows:

- FAA - \$14.7 million
- DOAV - \$3.4 million
- Local - \$7.6 million
- Private/Other - \$2.0 million

The Airport Capital Improvement Program (ACIP) presented in the following tables details the key elements of the proposed runway extension project, the timing associated with each, and the potential funding source. The initial step in implementing the runway project is successful completion of the Environmental Assessment (EA). It is anticipated the EA will begin mid-2012 and be completed within 12 to 18 months allowing land acquisition services to be initiated during Spring 2014. Land services has the goal of successfully achieving a negotiated Purchase Agreement with the Owner, which then provides the support to request purchase funding to settle the property acquisition. It is anticipated that purchase funds will be required during federal fiscal year 2015. The County recognizes that the availability and timing of federal funding is dependent on the completion of the EA, as well as the continued congressional reauthorization of the Airport Improvement Program.

For ease of budgetary planning, the ACIP assumes annual federal entitlement funding for FCI remaining at \$150,000, and that discretionary funding is available following successful completion of the EA (please see Note 4 on Table 8-1). This condition would allow successfully negotiated sales to be settled during federal fiscal year 2015 and relocation of the church and



residences to occur as early as 2015. The design of the runway extension, removal and mitigation of obstructions, and mitigation of wetlands are also programmed for 2015. The obstruction removal construction is planned as the primary runway project element during 2016, with the relocation of the localizer, PAPI, and power lines, as well as the actual runway extension construction as early in Phase II (2017-2021) as funding will allow.



Table 8-1
Chesterfield County Airport
Airport Capital Improvement Program (ACIP) – Phase I

Ref No.	Project Description	Fiscal Year/s	Estimated Cost ¹	FAA Funding		DOAV Eligible Funding	Local Funding	Private or Other Investment
				NPE	DISC			
1	Obstruction Removal – Industrial Park (DD/CO) ²	2012	\$25,000	\$0	\$0	\$0	\$25,000	\$0
2	Environmental Assessment	2012-2013	\$630,000	\$388,167	\$178,833	\$50,400	\$12,600	\$0
3	Construct 10-unit T-hangar ³ (DD/CO) – ALP Facility #21	2013	\$600,000	\$0	\$0	\$0	\$600,000	\$0
4	Land and Easement Acquisition Services (Phase 1) ⁴	2014	\$300,000	\$270,000	\$0	\$24,000	\$6,000	\$0
5	Land and Easement Acquisition (Phase 2) ⁴ : Parcel 1- \$2,000; Parcel 2- \$6,000; Parcel 3- \$70,000; Parcel 4- \$220,000; Parcel 5- \$550,000; Parcel 6- \$75,000; Parcel 7- \$525,000; Parcel 8- \$5,000; Parcel 9- \$180,000; Parcel 10 - \$1,000; Parcel 11- \$2,000; Parcel 12- \$7,000; Parcel 15- \$80,000	2015	\$1,700,000	\$180,000	\$1,350,000	\$136,000	\$34,000	\$0
6	Land Acquisition (Phase 3) Relocation – Parcels 63, 64, 65	2015	\$1,000,000	\$0	\$900,000	\$80,000	\$20,000	\$0
7	Extend Runway (DD)	2015	\$400,000	\$0	\$360,000	\$32,000	\$8,000	\$0
8	Obstruction Removal (DD) – On Airport ⁵	2015	\$100,000	\$0	\$90,000	\$8,000	\$2,000	\$0
9	Install Obstruction Lights (DD/CO) ⁶	2015	\$20,000	\$0	\$18,000	\$1,600	\$400	\$0
10	Wetland Mitigation	2015	\$2,300,000	\$0	\$2,070,000	\$184,000	\$46,000	\$0



11	Rehabilitate Auto Parking (DD)	2015	\$300,000	\$0	\$0	\$240,000	\$60,000	\$0
12	Construct Taxiway Turnout/Hold Apron (DD)	2015	\$80,000	\$0	\$72,000	\$6,400	\$1,600	\$0
13	Obstruction Removal (CO) – On Airport	2016	\$250,000	\$150,000	\$75,000	\$20,000	\$5,000	\$0
14	Construct Conventional Hangars ^{3, 7} (DD/CO)	2016	\$5,000,000	\$0	\$0	\$0	\$3,000,000	\$2,000,000
15	Construct Taxiway Turnout/Hold Apron (CO)	2016	\$170,000	\$0	\$153,000	\$13,600	\$3,400	\$0
16	Replace Rotating Beacon (Beacon Only) (DD/CO)	2016	\$50,000	\$0	\$45,000	\$4,000	\$1,000	\$0
17	Rehabilitate Auto Parking (CO)	2016	\$1,800,000	\$0	\$0	\$1,440,000	\$360,000	\$0
18	Pilot Activity Center ⁸ – ALP Facility #24	2016	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL PHASE I:			\$14,725,000	\$988,167	\$5,311,833	\$2,240,000	\$4,185,000	\$2,000,000

Notes:

NPE = Non Primary Entitlements

DISC = Discretionary funding

CO = Construction phase

DD – Design & Development phase

¹All figures are gross order of magnitude estimates based on 2010 dollars.

²Obstruction Removal for parcels 28-31 with existing easements.

³Site preparation has been completed as part of a previous project.

⁴Discretionary funding for FY 13-14 likely unavailable due to anticipated EA completion in the 1st quarter of calendar year 2014.

⁵Obstructions are located north of existing Runway 15 threshold, east and west of existing Runway 33 threshold and north and south of Whitepine and Airport Road intersection.

⁶Obstruction lights to be installed along peak of terrain over gas line to the west of runway.

⁷Funding for hangar construction could be local (County) or private investment as negotiated

⁸County has not developed cost estimates for this project at this time. Project not eligible for FAA or DOAV funding.

Source: Delta Airport Consultants, Inc.



Table 8-2
Chesterfield County Airport
Airport Capital Improvement Program (ACIP) – Phase II

Ref. No.	Project Description	Estimated Cost ¹	FAA Eligible Funding	DOAV Eligible Funding	Local Funding	Private or Other Investment
1	Relocate Power Lines Underground	\$250,000	\$225,000	\$20,000	\$5,000	\$0
2	Relocate Localizer (DD/CO)	\$200,000	\$180,000	\$16,000	\$4,000	\$0
3	Relocate PAPI (DD/CO)	\$70,000	\$63,000	\$5,600	\$1,400	\$0
4	Extend Runway (CO)	\$3,100,000	\$2,790,000	\$248,000	\$62,000	\$0
5	Construct Blast Pads (DD/CO)	\$400,000	\$360,000	\$32,000	\$8,000	\$0
6	Relocate Glideslope Equipment	\$300,000	\$270,000	\$24,000	\$6,000	\$0
7	Install MALSR (DD/CO)	\$500,000	\$450,000	\$40,000	\$10,000	\$0
8	Relocate Fuel Farm ² (DD/CO) – ALP Facility #27	\$2,000,000	\$0	\$200,000	\$1,800,000	\$0
9	Construct Alternative 24-hour Fueling Site ² (DD/CO) – ALP Facility #36	\$150,000	\$0	\$0	\$150,000	\$0
10	Expand Airfield Maintenance and Equipment Building (DD/CO) – ALP Facility #17	\$150,000	\$0	\$120,000	\$30,000	\$0
11	Acquire SRE Equipment ³ – Wheel loader & attachments (sweeper, displacement & rotary plows)	\$425,000	\$0	\$50,000	\$375,000	\$0
12	Public Observation Park ⁴ – ALP Facility #31	\$0	\$0	\$0	\$0	\$0
TOTAL PHASE II:		\$7,545,000	\$4,338,000	\$755,600	2,451,400	\$0

Notes: CO = Construction phase

DD = Design and Development phase

¹All figures are gross order of magnitude estimates based on 2010 dollars.

²The DOAV's fuel farm funding policy was changed in August 2011, allowing a \$200,000 cap for a 25 year period. No additional state funding beyond the \$200,000 will be available for relocation of the fuel farm or alternative fuel site. The remaining balance will be locally funded.

³SRE Equipment is eligible for DOAV funding through their maintenance program at \$50,000 for a period of 5 years.

⁴County has not developed cost estimates for this project at this time. Project not eligible for FAA or DOAV funding.

Source: Delta Airport Consultants, Inc.



Table 8-3
Chesterfield County Airport
Airport Capital Improvement Program (ACIP) – Phase III

Ref. No.	Project Description	Estimated Cost ¹	FAA Eligible Funding	DOAV Eligible Funding	Local Funding	Private or Other Investment
1	Construct 10-unit T-Hangar (small) ² (DD/CO) – ALP Facility #23	\$900,000	\$0	\$0	\$900,000	\$0
2	Relocate Taxiway (DD/CO) ³	\$4,000,000	\$3,600,000	\$320,000	\$80,000	\$0
3	Demolition of TW 'B' & 'C'/Construct Replacement TW (DD/CO)	\$500,000	\$450,000	\$40,000	\$10,000	\$0
4	Aviation Education Facility ⁴ – ALP Facility #32	\$0	\$0	\$0	\$0	\$0
TOTAL PHASE III:		\$5,400,000	\$4,050,000	\$360,000	\$990,000	\$0

Notes: CO = Construction phase

DD = Design and Development phase

¹All figures are gross order of magnitude estimates based on 2010 dollars.

²Site preparation has been completed as part of a previous project.

³Cost includes reducing width of Taxiways 'D' and 'E' to 35'.

⁴County has not developed cost estimates for this project at this time. Project not eligible for FAA or DOAV funding.

Source: Delta Airport Consultants, Inc.

